Volume 94 Number 2

STEEL

For forty-eight Years—IRON TRADE REVIEW

PRODUCTION • PROCESSING • DISTRIBUTION • USE

The Week in Perspective

NINETEEN THIRTY-FOUR is ushered in auspiciously by the steel producing industry, operating (p. 11) the past week at 31 per cent of capacity, a figure not in itself impressive but double the rate of a year ago. While new business the next few weeks may not be important, with consumers engaged in taking inventory, making repairs and working off heavy shipments received before the code deadline of Dec. 31, prospects for the first quarter as a whole are building up strongly (p. 29). For one thing, the three musketeers among steel consumers—automobiles, railroads and building construction—as yet have not released the heavy tonnages which suppliers are certain they will receive.

Slow To Get New Designs in Production

Automobile production is slow to reach a normal level, one difficulty being (p. 15) with changing over tools and equipment for high-speed production of such new model features as independent wheel suspension systems, streamlined bodies and other new details. Three distinct types of suspension systems are currently in use. . . . In one sense the auto industry is taking the Count, with the addition (p. 16) of two so-titled foreigners to body-designing staffs of two large producers. . . . Taking the count of imports of iron and steel for November, the total—28,979 tons—is the smallest (p. 12) since last May. Exports, however, continue at a high level, possibly due in part to more favorable foreign exchange. The 11-month total for 1933 exceeded the same period in 1932 by over 600,000 tons.

Relief Problems Become Lighter This Winter

Chill winter winds added to scarcity of jobs in past years have meant additional burdens for city relief agencies and, in some districts, for steel companies themselves. This winter their task is lightened (p. 10) by the fact that under the steel code and better business 200,000 more men are at work; furthermore, the federal government is now taking an active part in financing and administering relief. . . . But labor troubles, of which there none last year, continue (p. 12) to break out, 2000 scattered miners going on strike in western Pennsylvania. More hearings on the "captive" mine labor situation are scheduled (p. 12) this week, with representatives from coal and coke subsidiaries of leading steel companies being asked to attend. . . . Congress will hear plenty (p. 14) from the President during the present session.

Millions Released for Improving Equipment

Important expenditures for new plant equipment were approved last week. One steel company has ordered (p. 11) a new cold strip mill as part of a $1,000,000 program of purchases. Another has purchased about $100,000 worth of forming rolls for production of small sizes of electric weld pipe. If tests are successful, $1,500,000 will be spent (p. 40) for a complete new mill to produce this pipe in sizes down to 2-inch. . . . An older but still widely used pipemaking method, in which skelp is heated and pulled through a die, has been placed on an efficient basis (p. 21) by a Pittsburgh mill. Furnaces, charging machines, draw benches and finishing equipment are arranged to avoid any backtracking of the product.

Concentrate on Alloys and Better Selling

Looking ahead, the secretary of the American Iron and Steel institute visions improved business and declares (p. 42) that for the first time in many years the art of true salesmanship is becoming a factor in the selling of steel, a trend which was forcibly described in last week's STEEL, The Yearbook of Industry. . . . Hand in hand with better selling methods is the constant development of alloy steels, the latter being backed aggressively by many of the leading producers. In this regard the alloy research work of the Engineering Foundation, sponsored by steel companies, technical societies and more recently (p. 23) by automobile builders, points significantly to the widespread advances in the field of transportation which alloys have made possible.

Steel's Burden in Carrying Idle Employes Is Lifting

PITTSBURGH

STEEL mill labor in want has found a new parent. The adoption appears to be legal—at least all parties concerned seem satisfied.

The former parent, the steel company, was wearying and growing financially unable to follow through on its paternal responsibility toward unemployed workers. The new parent is the alphabetically-symboled government relief agency, and labor seems satisfied with the change.

Whereas the winter of a year ago witnessed widespread aid by the larger steel companies in dispensing food, shelter and other necessities among former employes then idle, young though this winter be, there already is a marked change.

The responsibility of this nature the steel industry took upon itself last year and in years previous has been ameliorated on one side by the companies' own ability this year to employ more men. It has been almostly completely taken over in other cases by the 100 per cent entry of the federal government into the field of charitable aid.

NRA Cuts Relief Rolls

Nineteen thirty-three was a momentous twelve months in more ways than one. Consider the advent of the NRA, as it affects this relief problem. This legislation placed over 400,000 steelworkers at work and has kept them there as of this writing. A year ago there were barely 200,000 men in the steel mills of this country. Thus, a net of some 200,000 men plus their families, that the steel industry will cease to have to care for. The year also brought a higher minimum rate of pay to the steel worker.

Nineteen thirty-three also brought the revived rise in labor unions, which in some cases make the claim of caring for members in need. Last year witnessed a midsummer revival in general business, aside from steel, that absorbed many of the steel industry's idle employes.

And 1933 for a while also gave steady work to employes of the steel industry—such that in many cases some savings could be laid by. By contrast to a year ago, both economic and artificial means of the past year have combined to relieve the steel industry's management of most of its responsibility to idle men.

To show the attitude at present, take the case of a large steel producer at Pittsburgh. This concern will, in anywhere near normal times, employ some 50,000 to 55,000 men. Through all of last winter a large idle warehouse in Pittsburgh was stocked with food by the company and this was dispensed among thousands of idle employes. The cost of this plan totaled $150,000 over 16 weeks.

In addition, this company, which operates over 15 distinct steel and iron-making units in the Pittsburgh district, supplied use of company houses free to those in want. Neither interest nor rent on the houses' mortgages was requested, the only stipulation being that the tenant pay taxes.

LABOR has been unreasonably liquidated and no good has come of it," declared E. T. Weir, (above) chairman of National Steel Corp., Pittsburgh, in addressing the American Academy of Political and Social Science at Philadelphia, Jan. 5. "So far as my company is concerned, there will never again be any general wage reductions below the present scale without the specific approval of the elected employes' representatives. . . . Wall Street is only the gateway to Main Street of the nation. . . . We have at last identified the forgotten man as the industrial security holder . . . . We cannot lose sight of capital as an economic factor."

This generous plan for caring for needy employes went far through the 1932-33 winter toward the total requisites in Pittsburgh. Such help by the steel producer itself greatly aided the local welfare agencies in their administration of the needy. In Pittsburgh, some six agencies had been aiding the idle through last winter in addition to such work as the steel concerns themselves were doing, but the source of funds of these agencies neared the vanishing point after the winter.

At Pittsburgh week before last, 30,674 individuals were on relief and in Allegheny county, in which Pittsburgh is located, the latest available figure which was for the third week of December, showed 29,848 persons additional dependent upon relief. This total of over 60,000 individuals cost between $230,000 and $240,000 weekly to feed, clothe and shelter.

The number of cases is down, however, about 15,000 from the high of recent years, which was at 75,126 cases in a week of May, 1933. These cases now are being taken care of almost 100 per cent by federal relief agencies, and most municipal and county relief agencies in the Pittsburgh district have reverted to case work. Thus, one agency at Pittsburgh is now caring for little over 1000 individuals while last winter it administered to about 40,000.

Industry Still Contributes

Therefore, welfare work in the steel industry has in the past twelve months passed through two distinct stages. The first saw municipal relief plus private aid, such as that fostered by the steel industry, give away to federally-sponsored care.

Into the latter class of relief grants the steel industry nonetheless makes a heavy contribution, though it may be indirect. Through increased taxes to the federal government and through voluntary contributions, the steel industry is bearing its share of the burden. Last fall a leading steel mill in Pittsburgh voluntarily donated $25,000 to the Welfare fund there. Other contributions are similar.

In addition, life insurance funds in the form of group policies are being kept alive. One leading steel mill at Pittsburgh has kept active through all of the past four years of depression a blanket $50,000,000 life insurance policy for its employes.

Though this policy has no disability clause the following fact drives home the policy's benefit. Since its inception an average of $2000 for each death claim has been paid; be-

fore the group policy when life insurance was a matter of individual choice on the part of the steel mill employe, only $75, on the average, for each death claim was paid.

The steel industry's welfare problem is different in other than plants located in or near a large city. Consider the relief work being done by another Pittsburgh district mill, located some 60 miles from the "Golden Triangle," downtown Pittsburgh. This steelworks is located in the mid-country and because of its location a company town has sprung up. The tie between employer and employe is closer, therefore, than where the steel mill worker files out the plant gate at the end of his shift to be swallowed up in a large city.

In this mill near Pittsburgh a "fellowship fund" has been maintained for many years. Dues of $1 a month by each mill employe working are compulsory. In addition, the mill management matches or betters this sum. The fund is nonprofit making and distributes only clothing and food. Shelter is given free by the steel company through affording the idle worker his rent free in company-owned homes.

Closer Contact with Employes

Generally speaking, this type of isolated mill town has had its troubles in years past of the depression to make funds at its disposal go around in the distribution it undertakes, but because the mill is comparatively isolated, personal contacts are more intimate and this form of relief has been successfully administered. It is this type of industrial community which underwent relatively no labor strikes, riots or troubles last summer and fall.

As the winter progresses two parallels that occurred last summer are recalled. Many strikers in the steel mills, and more in the western Pennsylvania captive mine fields, lost valuable weeks of pay when they chose to defy their management and walk out of the mill or mine.

By contrast, consider the several thousand loyal workers at the Clairton works of Carnegie Steel Co. who laid aside a nest egg in savings by choosing to stick by their management during the Clairton strike. Forty-cent an hour labor at Clairton got $9.60 a day during the strike, instead of the usual $3.20, workers being paid 24 hours daily for each day of the 20-day siege. Such loyalty has not been forgotten by the steel industry when relief is needed.

News of the Week:

Transportation

PUBLIC hearing on the proposal to eliminate "fabricated-in-transit" clauses in iron and steel freight tariffs has been postponed from Jan. 24 to Feb. 28, at the Palmer house, Chicago. The change was suggested by the Independent Steel Fabricators' Traffic association and accepted by the traffic committee of the American Iron and Steel institute.

Interested independent steel fabricators are urged to communicate with H. N. Holdren, traffic manager, Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, chairman of the Fabricators' association.

¶Freight rate on unfinished, rough, hot-rolled steel rods in coils, not less than No. 8 gage and not over 1¼ inch in diameter, from Worcester to Millbury, Mass., will be reduced from $2.40 to $1.13 under a proposal to the New England Freight association.

New Capacity

YOUNGSTOWN SHEET & TUBE CO. has completed plans for an electric weld mill making 2 to 8-inch pipe, augmenting a similar size mill at its Brier Hill Works, Youngstown, O. The process is a new one developed by company engineers.

Before proceeding with construction of the new mill, tests on smaller sizes of pipe and tubing will be made on the the present mill by installing a new set of forming rolls, for which the Yoder Co., Cleveland, has the contract.

¶Wheeling Steel Corp., Wheeling, W. Va., has awarded a contract for a continuous strip mill at its Yorkville, O., plant to the Mesta Machine Co., Pittsburgh.

Institute

AMERICAN IRON AND STEEL INSTITUTE deadline of Dec. 31 on shipments against fourth quarter contracts, under the NRA code is reported disadvantageous in merchandising as well as uneconomical from the operating standpoint.

With most users taking inventory as of Jan. 1, the enforced receipt of material in December is said to have worked particular hardship at this time. No direct protests have yet reached the institute, and tonnage undelivered against accepted specifications appears relatively small.

Some consumers believe they have legal grounds for redress, but no move in this direction has yet been reported. One alleviating measure probably will be the naming of quarterly prices well in advance.

¶Protests of motor truck operators, through the American Highway Freight association, charging discrimination against trucks in favor of the railroads will be heard by directors of the institute Thursday.

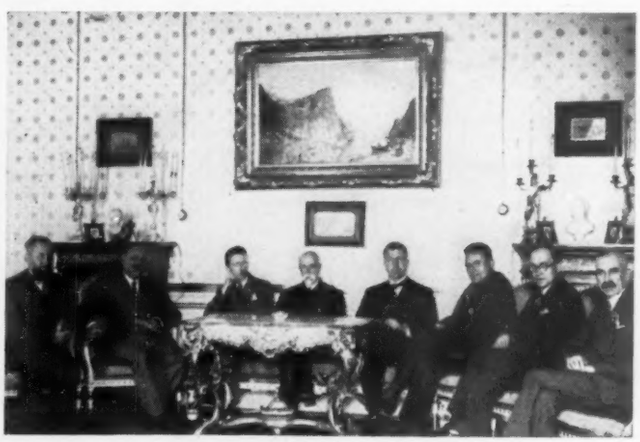
Under the steel code, prices are quoted on a delivered basis, this being the base plus the railroad freight, but with allowance of 65 per cent of the rail rate where truck delivery is specified.

Some truck operators contend that there should be a reversion to the old system of quoting f.o.b. mill plus whatever transportation charges are incurred. Steel producers point that the present system is designed to remove any inequalities in the treatment of buyers.

Production

STEELWORKS opened 1934 operating at 31 per cent, or exactly twice the rate of the first week of January, 1933.

This week a rebound of several



STEEL gets its foreign news first hand. Third from the left is Vincent Delport, European manager of STEEL. Next to him, behind the table, is President Mazaryck of Czechoslovakia

points is probable despite scheduled decreases in the Pittsburgh, Chicago and eastern Pennsylvania districts. Youngstown mills are expected to be up 4 points, to 36 per cent, while most other districts will remain stationary.

National Steel Corp. has contributed to a strong production situation by lighting the two new 150-ton open-hearth furnaces at its Great Lakes unit in Detroit. All eight open hearths at the Great Lakes plant are now melting, partially for stock, while four of the ten Ford open hearths are on, giving the Detroit district an operating rate of 79 per cent.

Pittsburgh mills last week eased 5 points to 22 per cent, and this represents stocking at some mills. Nearby Wheeling steelworks advanced 15 points to 56 per cent last week when 20 out of 39 open hearths melted.

Central eastern seaboard operations declined 2 points to 22½ per cent, with a further drop probable this week. New England, however, gained 23 points, going to 95 per cent, with two makers operating full.

Chicago operations receded 6 points to 34 per cent last week, and may decline this week. Cleveland-Lorain works averaged 51 per cent, 6 points below the pre-holiday week. Otis lighted one open hearth. National Tube at Lorain dropped two units.

After New Year day Buffalo mills fell 8 points to 29 per cent, and expect to hold close to 30 most of the month. Birmingham operations continue steady at 52 per cent.

Financial

MAHONING SAVINGS & TRUST CO., Youngstown, O., has been appointed receiver for 580 shares of stock of the Cold Metal Process Co., Youngstown, owned by A. P. Steckel, inventor of the Steckel mill, and former president of the company. This is a phase of a controversy between Mr. Steckel and his business associates in the Cold Metal Process Co.

¶Harbison-Walker Refractories Co., Pittsburgh, has declared a preferred dividend of 1½ per cent, payable Jan. 20 to Jan. 10 record.

Labor

FOLLOWING a hearing Thursday between the national labor board and the H. C. Frick Coke Co., concerning the dispute over the recent election of employe representatives for collective bargaining at Frick coal mines, other hearings on the captive mine situation were scheduled for Monday, Jan. 8, at Washington.

Summoned to Monday's hearing are representatives of the coal and coke subsidiaries of the Jones & Laughlin Steel Corp., Allegheny Steel Co., Republic Steel Corp., Pickands, Mather & Co., Weirton Steel Co., Inland Steel Co., and Wheeling Steel Corp.

¶In the meantime, over 2000 coal miners in scattered locations of western Pennsylvania went on strike last week by way of protesting alleged NRA coal code violations. At Johnstown, Pa., near the Cambria works of Bethlehem Steel Co., the largest single walkout occurred Jan. 2, when

(*Please turn to Page* 42)

Foreign Trade

EXPORTS of iron and steel products from the United States in November, at 157,600 gross tons, were 7155 tons less than in October. Exports of scrap made a gain of 4427 tons. Galvanized sheets lost 6051 tons, seamless casing and oil line pipe 1897 tons.

Japan took the bulk of United States exports, 59,115 tons, Canada was second with 24,396 tons, Italy third with 18,323 tons, and Brazil was rated fourth with 11,718 tons.

For 11 months exports have totaled 1,166,107 tons, a gain of 625,594 tons over the total for 11 months of 1932. In this period scrap gained 483,016 tons and other items, 142,578 principally the more highly

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL

Gross Tons

	1933		1932	
	Imports	Exports	Imports	Exports
Jan.	21,892	56,720	31,053	40,660
Feb.	19,748	63,936	26,738	40,492
March	22,114	80,567	41,031	49,927
April	28,061	100,395	35,935	58,086
May	26,295	123,069	39,751	80,477
June	34,368	102,581	34,494	52,081
July	52,805	88,311	18,005	52,558
Aug.	46,839	119,374	23,623	32,955
Sept.	55,706	108,799	29,241	36,038
Oct.	46,673	164,755	33,693	41,226
Nov.	28,979	157,600	34,924	56,021
11 mo.	383,480	1,166,107	349,024	540,513
Dec.	.....	.....	29,390	54,118
Total	.....	.....	378,282	594,691

ORIGIN OF NOVEMBER IMPORTS

Gross Tons

	Pig iron	Manganese ore	Ferro-manganese
Netherlands	151	.....	.....
Norway	3	.....	708
Canada	360	.....	9,003
Kwantung	118	.....	.....
British India	3,447	.....	.....
Soviet Russia in Europe	.....	4,500	.....
United Kingdom	.....	12	.....
Poland	.....	.....	80
Total	4,079	4,512	9,791

	Sheets, skelp and sawplates	Structural shapes	Steel bars	Hoops and bands
United Kingdom	1	4	49	14
Germany	297	40	173	76
Belgium	380	1,763	1,671	989
Sweden	3	.....	199	5
Canada	1	.....	3	.....
France	.....	357	2	560
Norway	.....	.....	26	.....
Austria	.....	.....	3	.....
Netherlands	.....	.....	.....	28
Mexico	.....	.....	.....	10
Total	682	2,164	2,126	1,682

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Commodity	Nov. 1933	Oct. 1933	Nov. 1932
Pig iron	42	405	160
Ferromanganese and spiegeleisen	6	6	.....
Iron and steel scrap	85,603	81,176	29,184
Ingots, blooms, billets, slabs and sheet bars	112	846	31
Bars, iron	130	44	24
Bars, steel	1,944	2,414	1,106
Bars, alloy steel	134	196	107
Wire rods	2,062	2,645	472
Boiler plate	76	193	26
Other plate, not fabricated	1,593	2,026	931
Skelp, iron or steel	4,724	3,769	4,068
Iron sheets, galvanized	93	245	121
Steel sheets, galvanized	3,177	9,228	1,408
Steel sheets, black	4,859	5,792	2,929
Iron sheets, black	512	461	128
Strip steel, cold-rolled	728	615	624
Hoop, band, and scroll iron or steel	1,246	809	652
Tin, terne plate	15,647	15,448	2,275
Water, oil, gas, and other tanks, except lined	221	337	597
Shapes, not fabricated	998	2,393	1,014
Shapes, fabricated	1,488	1,906	761
Plates, fabricated	298	400	52
Metal lath	83	148	57
Frames, sashes, and sheet piling	32	13	551
Rails, 50 pounds	7,418	6,971	455
Rails, under 50 pounds	54	430	45
Rail fastenings	2,414	1,723	37
Switches, frogs, crossings	158	106	107
Railroad spikes	644	395	93
Railroad bolts, nuts	221	185	20
Boiler tubes, seamless	283	263	436
Boiler tubes, welded	16	13	14
Casing and oil-line pipe, seamless	3,726	5,623	942
Casing and oil-line pipe, welded	701	2,611	337
Seamless black pipe, other than casing, etc.	142	129	67
Malleable-iron screwed pipe fittings	219	453	119
Cast-iron screwed pipe fittings	72	195	76
Cast-iron pressure pipe and fittings for	718	319	180
Cast-iron soil pipe and fittings for	475	265	27
Welded black steel pipe	1,407	1,966	643
Welded black wrought-iron pipe	75	108	246
Welded galvanized steel pipe	1,949	2,054	1,129
Welded galvanized wrought-iron pipe	72	46	109
Riveted iron or steel pipe and fittings	17	2	5
Plain iron or steel wire	1,657	1,793	204
Galvanized wire	1,213	1,627	200
Barbed wire	3,116	2,606	853
Woven-wire fencing	57	55	51
Woven-wire screen cloth	36	74	51
Wire rope	372	258	107
Other wire, manufactures	253	357	167
Wire nails	984	832	711
Horseshoe nails	51	35	49
Tacks	58	25	30
Other nails, staples	185	270	170
Ordinary bolts, machine screws and washers	357	560	206
Iron castings	969	255	370
Steel castings	224	59	42
Car wheels and axles	1,208	240	257
Horseshoes	25	6	18
Iron, steel forgings, n.e.s.	246	331	170
Total	157,600	164,755	56,021

finished. Tin plate shipments were up 40,782 tons, galvanized steel sheets 21,662 tons, heavy rails 21,124 tons, seamless casing and oil line pipe 12,411 tons and barbed wire 10,106 tons.

November imports at 28,979 tons were the smallest since May, 1933, 17,694 tons less than in October and 5945 tons less than in November, 1932. Pig iron showed a decline of 5542 tons from October, scrap 4464 tons, shapes 1317 tons, wire rods 957 tons, and hoops and bands 669 tons. Ferromanganese was the only item to give a substantial increase—4361 tons.

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Commodity	Nov. 1933	Oct. 1933	Nov. 1932
Pig iron	4,079	19,621	8,776
Sponge iron	.....	102	5
Ferromanganese	9,791	5,430	3,326
Ferrochrome	.....	.....	18
Ferrosilicon	310	84	.....
Other ferroalloys	.....	.....	.....
Scrap	2,935	7,399	87
Steel ingots, blooms, etc.	69	251	94
Concrete bars	479	85	1,474
Hollow bar, drill steel	118	71	103
Merchant steel bars	2,026	2,178	3,150
Iron slabs	.....	.....	7
Iron bars	93	34	9
Wire rods	778	1,735	935
Boiler and other plate	43	.....	10
Sheets, skelp, s a w plate	682	638	3,693
Tin plate	.....	11	21
Structural shapes	2,164	3,481	5,655
Sheet piling	.....	72	.....
Rails and fastenings	981	704	383
Cast iron pipe, fittings	186	.....	50
Welded pipe	150	185	434
Other pipe	278	342	89
Barbed wire	389	311	1,876
Round iron, steel wire	458	261	102
Telegraph, telephone wire	.....	.....	2
Flat wire, strip steel	150	210	131
Wire rope, strand	163	103	148
Other wire	125	77	243
Hoops and bands	1,682	2,351	2,741
Nails, tacks, staples	651	696	1,199
Bolts, nuts, rivets	26	41	33
Horse and mule shoes	20	55	22
Castings, forgings	153	145	108
Total	28,979	46,673	34,924

DECEMBER IRON PRODUCTION

	No. in blast last day of month Dec.	Nov.	Total tonnage Merchant	Nonmerchant
Ohio	19	19	64,601	246,584
Penna.	19	24	44,810*	297,502*
Alabama	10	7	63,024	64,015*
Illinois	4	5	17,050	54,887
New York	7	7	49,127	42,123
Colorado	1	1		
Indiana	5	5	993	161,098
Maryland	3	3		
Virginia	0	0		
Kentucky	1	1		
Mass.	0	0		
Tennessee	0	0		
Utah	1	1	4,452	81,870
West Va.	1	1		
Michigan	3	3		
Minnesota	0	0		
Missouri	0	0		
Total	74	77	244,057*	948,079*

*Includes ferro and spiegeleisen.

1933 Iron Output Up 52 Per Cent; December Increases

PRODUCTION of coke pig iron in the United States in 1933 totaled 13,221,707 gross tons and made an increase of 52.3 per cent over the preceding year. The 1932 output of 8,674,067 tons was an all-time low mark; it was exceeded in the past year by 4,547,640 tons. Production in 1931 was 18,263,011 tons.

Average daily output for 1933 was 36,223 tons, contrasted with 23,699 tons in 1932, 50,035 tons in 1931, 86,141 tons in 1930 and 115,808 tons in the peak year 1929.

AVERAGE DAILY PRODUCTION

	1933	1932	1931	1930
Jan.	18,348	31,336	55,337	91,573
Feb.	19,752	33,122	61,114	101,640
Mar.	17,484	31,194	65,448	104,930
Apr.	20,786	28,524	66,986	106,371
May	28,784	25,282	64,355	104,564
June	42,165	20,867	54,599	97,817
July	58,108	18,394	47,170	85,110
Aug.	59,137	17,035	41,264	81,455
Sept.	50,264	19,788	38,947	75,893
Oct.	43,824	20,795	37,831	69,851
Nov.	36,124	20,858	36,727	62,182
Dec.	38,456	17,650	31,625	53,732
Av.	36,223	23,699	50,035	86,141

December's total production of 1,192,136 tons made a sharp gain of 108,396 tons, or 10 per cent, over the 1,083,740 tons of November. December, however, was a one-day longer month. For the first time since 1928 was the output of December better than for November.

Average daily production of 38,456 tons in December was an improvement of 2332 tons per day, or 6.47 per cent, over the 36,124-ton rate of the previous month. Normally, December is a month of declining production, thus the upturn of the past month was the first registered since 1925.

Active furnaces on Dec. 31 totaled 74, which, compared with the 77 making iron on Nov. 30, was a loss of three units. The year started off with only 45 operating in January; this dropped to 44 in February and 38 in March; rose to 48 in April, 61 in May, 90 in June and reached a top of 105 in July. Active stacks then dropped off to 98 in August, 89 in September, 81 in October, 77 in November and 74 in December.

Relating production to capacity, the operating rate for December was 27.9 per cent, against 26.2 per cent in November and 31.8 in October. The year's high was 42.8 per cent in August and the low 12.7 per cent in March.

During December, six furnaces were blown in and nine were blown out or banked. All changes involved only steelworks or nonmerchant units.

Furnaces resuming in December were: In Ohio: Haselton No. 2, Republic Steel Corp.; Youngstown, C, Youngstown Sheet & Tube Co. In Pennsylvania: National No. 2, National Tube Co. In Alabama: Bessemer Nos. 5 and 6, Fairfield No. 5 Tennessee Coal, iron & Railroad Co.

Stacks blowing out or banking were: In Ohio: Ohio No. 2, Carnegie Steel Co.; Portsmouth, Wheeling Steel Corp. In Pennsylvania: Edgar Thomson I and G, Duquesne Nos. 3 and 4 and Carrie No. 1, Carnegie Steel Co.; National No. 2, National Tube Co. In Illinos: South Works Old No. 5, Illnois Steel Co.

MONTHLY PIG IRON PRODUCTION

	1933	1932	1931
Jan.	568,785	971,437	1,715,443
Feb.	553,067	960,550	1,711,192
March	542,013	967,015	2,028,906
April	623,606	855,734	2,009,582
May	892,326	783,769	1,995,001
June	1,264,953	626,015	1,637,998
July	1,801,345	570,222	1,462,270
Aug.	1,833,265	528,105	1,279,205
Sept.	1,507,931	593,640	1,168,436
Oct.	1,358,540	644,648	1,172,781
Nov.	1,083,740	625,753	1,101,820
Dec.	1,192,136	547,179	980,377
Total	13,221,707	8,674,067	18,263,011

RATE OF OPERATION

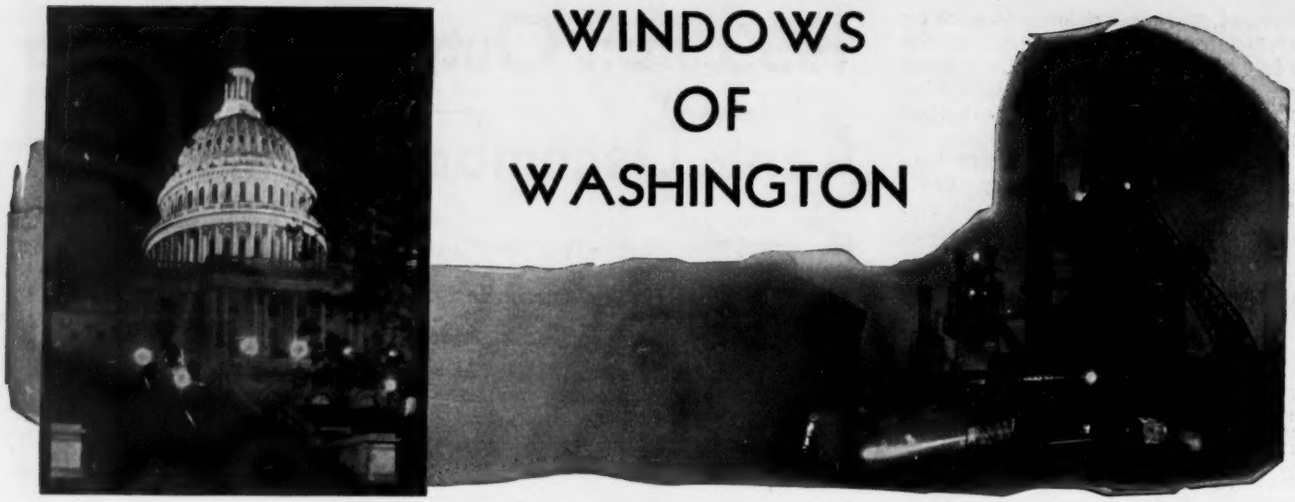
(Relation of Production to Capacity)

	1933[1]	1932[2]	1931[3]	1930[4]
Jan.	13.3	22.1	38.4	65.0
Feb.	14.3	23.4	42.5	72.1
March	12.7	22.0	45.4	74.5
April	15.1	20.2	46.5	75.4
May	20.9	17.9	44.7	74.2
June	30.6	14.7	37.9	69.3
July	42.2	13.0	32.7	60.3
Aug.	42.8	12.0	28.7	57.8
Sept.	36.4	14.0	27.0	53.8
Oct.	31.8	14.7	26.3	49.6
Nov.	26.2	14.7	25.5	44.1
Dec.	27.9	12.5	22.0	38.1

[1]Based on capacity of 50,313,975 gross tons, Dec. 31, 1932; [2]on capacity of 51,598,175 tons; [3]on capacity of 52,515,875 tons; [4]on capacity of 51,490,680 tons. Capacities by American Iron and Steel institute.

Colorado Mining 50,000 Tons

Colorado Fuel & Iron Co. is shipping 50,000 tons of iron ore monthly from its Sunrise, Wyo., mines to its plant at Pueblo, Colo. This is to take care of present orders and in anticipation for new business.



WINDOWS OF WASHINGTON

WASHINGTON

ALWAYS the consummate politician—which is a compliment—the President never showed to better advantage than when he addressed congress Wednesday at the opening of the 73rd session.

It was a wonderfully soothing message he delivered—some call it a lecture—calculated to relieve the tension of both congress and the country over the economic situation, yet avoiding every semblance of legislative recommendaton or commitment for the administration.

Probably indicative of White House strategy, within 24 hours the President submitted his budget, a budget which will go down in history as the ten billion dollar one, yet taking the sting out of the present tight situation by the implication that the fiscal year 1936 probably would see a balance.

Presumably, the procedure throughout the session will be a steady flow of messages from one end of Pennsylvania avenue to the other as situations arise, with the President always ready with a plan or an alternative to anything displeasing to the administraton.

Since there are exactly as many chances for congress to break loose unexpectedly as there are members of both houses, which is 531, to forecast the course of congress is exceedingly hazardous, but it appears to be a safe guess at this juncture that congress will ratify what the President has done—when that is required; will grant such additional powers as he requests, then adjourn late in April or early in May.

Roosevelt Still the Master

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Seek Permanency for NRA

• • •

Johnson Over Small Codes

PRIMARY interest still centers on money. In his message Wednesday the President referred to a dollar which would be less variable than in the past, whereas last October he espoused a dollar which would have the same value next generation as this. Washington interprets this as a hedge.

In his Wednesday message the President also referred to the position of foreign nations as making any stabilization of currency impossible now, clearly indicating that the administration has been in touch with Europe on the matter of stabilization, a situation which was officially denied recently.

Those who sense developments in Washington readily believe that the gold buying policy has proved a disappointment, when measured by its objective—the raising of commodity prices. Hence a veering away from this policy would not be surprising. A message on the monetary problem is an early possibility.

There has been no lack of advice to the President that good spring business, described by some as approaching the proportions of a boom, only awaits the elimination of uncertainty concerning the dollar. Any devaluation would be preferable to uncertainty, it has been pointed out repeatedly.

So something on money is in prospect, and chances are it will be assuring, considering also the fact that the treasury has some hundreds of millions to raise for relief work between now and June 30.

Reports coming to Washington, especially from New York, are that steel production in the late winter and early spring is going to rise to a level exceeding even the peak of 1933, which was 57 per cent in late July, and for all the President's warmth for reform, nothing is going to be permitted to snuff out anything that would whittle down requirements for relief expenditures.

SUPERFICIALLY, the President's executive order of Jan. 2 transferring to NRA Administrator Johnson complete authority to give final approval to codes for industries employing 50,000 or fewer workers does not change the situation.

It probably increases the prestige of the general, who recently has felt more secure than ever, but the fact is the President has not made any vital move in regard to any code, large or small, without the tacit consent of the general. The practical effect is to eliminate the last step after NRA and industries had reached an agreement.

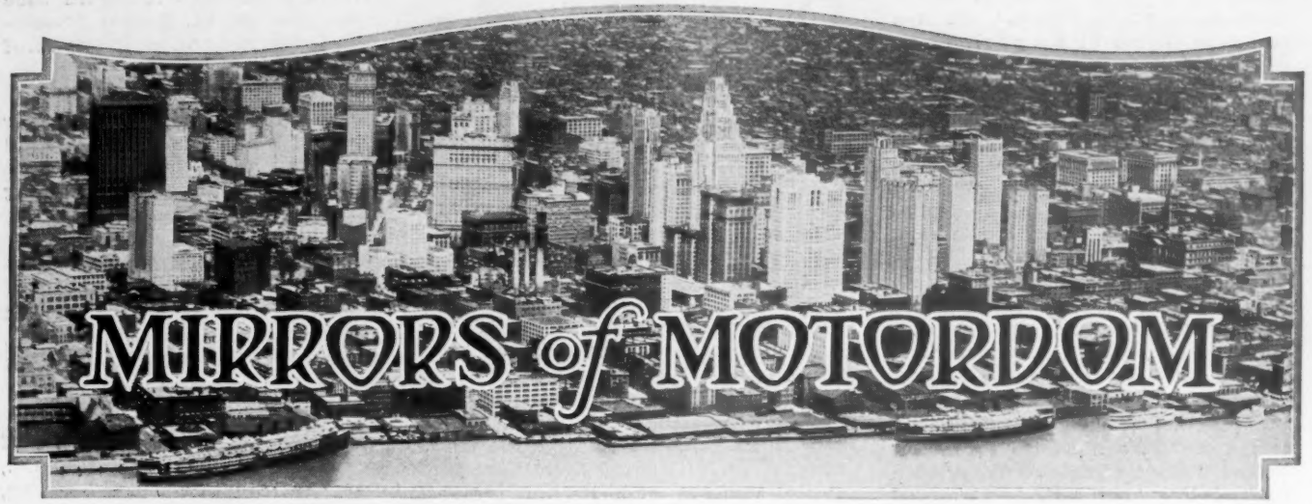
One of the President's special messages probably will be to urge the first step toward making NRA permanent. Under the recovery act, there is an automatic expiration on June 16, 1935. In his message Wednesday the President spoke of the demand made upon citizens to surrender license to do as they pleased in their business relationships in return for protection against exploitation by combinations of their fellow men.

At another juncture the President spoke specifically concerning the Sherman law:

"We seek the definite end of preventing combinations in furtherance of monopoly and in restraint of trade, while at the same time we seek to prevent ruinous rivalries within industrial groups which in many cases resemble the gang wars of the underworld and in which the real victim in every case is the public itself."

Within 60 days, something concerning NRA for the long run will develop. It will be the first step in business reform, following recovery.

Two codes signed by the President recently are the cast iron pressure pipe code, effective Jan. 1, and the coated abrasive code, effective Jan. 8.



Ford Now Has Last Laugh

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Stored Steel Is Sweating

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Chevrolet Springs Unique

DETROIT

BACK in 1927, when Henry Ford struggled from March to September to change over from Model T to Model A, Detroit had a good laugh. It contrasted the 9-month period at Fordson with the four to six weeks required for other manufacturers to change models.

The fact was, of course, that Ford was completely redesigning his car and not only did he have new parts to contend with but he also had to completely rebuild or replace his equipment.

Now, the shoe is on the other foot. In supplanting the semi-elliptic type of front spring with the coil spring and independently mounted front wheels, General Motors and Chrysler have been up against the same problems that Ford was. They have learned that to design the new spring mechanism was one thing; to adapt it to production, quite another. Since November these manufacturers have been struggling more or less with the production of the new springs and suspensions and not all their troubles are over yet.

Incidentally, this delay occasioned by the new type of springs is also disquieting from the standpoint of sales. There are fears that the public may associate delay in achieving production with a defect in design, which is not the case, and increasing reports are heard of prospective buyers preferring to let someone else do the experimenting.

FORD, meanwhile, having made relatively few changes for 1934 has pushed production up to almost 3000 units a day, 5 days a week and is still expanding. Ford dealers everywhere are talking performance, a subject on which Chevrolet hopes to have more to say in 1934.

Ford has been slowly but steadily increasing employment at Fordson, he has heat on in another open-hearth steel furnace (four out of ten are now melting) and if he can lift production about 30 per cent higher Detroit expects Ford to leave red ink. The Ford goal is 4000 a day, or upward of 70,000 a month. Last week, for the tenth time since Dec. 2, the schedule was increased, a lift of 5000 putting the objective for January up to 57,000 units. In February, the 70,000-goal may be reached.

Chevrolet last week got up to about 300 assemblies a day, its chief difficulty being in welding the strip steel housing for its springs.

In the case of Chevrolet as also with most Chrysler lines, the January schedule is meaningless, inasmuch as production will be increased as rapidly as possible. There were only enough Chevrolets for display in 100 cities Saturday.

Pontiac's objective for January is 12,000 units. So is Hudson-Terraplane's, which originally was only 7000 for this month. Buick is 3000 behind and will try to make 8000 this month. A favorable court order will enable Willys to make upward of 5300 units, of which 1300 are for export, this quarter.

January production thus becomes difficult to gage. The first estimate of 200,000 appears to be high, entirely because of the delays in attaining volume production, in turn due chiefly to the new suspensions. February and March should be well over 200,000-unit months, according to present indications, whereas in the first quarter of 1933 total production was only 354,818.

Delays in production have backed up upon steel mills. Had December and January fulfilled the expectation for them a large portion of the steel inventories accumulated prior to the price advances would have been consumed by the end of January, and substantial releases been issued by this time for February shipment.

Even so, good tonnage is expected out before Jan. 20. Chevrolet has a "buy" coming shortly, while Ford also will be in the market. Automobile foundry stocks of pig iron are so large that it will be several months before really large shipments are again required.

Automotive interests which stored high finishes of sheets, especially Chrysler, are encountering severe losses. Stored on piers and in warehouses and all available idle plant space, this steel has not been protected from variations in temperature, and sweating has resulted. A large portion of this steel will be utilized nevertheless, but if it had been received from the mill in its present condition the rejections would have been tremendous.

IN THE Dec. 18 chapter of Mirrors of Motordrom the axleflex or Hudson-Terraplane system of independent front wheel suspension was described; in the Dec. 25 chapter the coil spring system of Plymouth, Dodge and all General Motors lines except Chevrolet and Pontiac was explained; Chevrolet and Pontiac now are out with still a third system, whereby the springs are mounted directly inside the front wheels instead of under the frame.

In these two lines the kingpins are mounted in supports rigidly attached to the frame. The front wheels still pivot about the kingpins, but the wheel spindles are not mounted directly on the kingpin pivots as heretofore.

Instead, on the kingpins are pivoted the spring housings from which the wheels swing vertically at the ends of horizontal arms. Radius rods, below the wheel support arms, also pivot on the spring housing and the brake flange plate, preventing rotation of the latter.

Next to its springs, Chevrolet is

featuring a more powerful motor dubbed the "blue streak." It is a race-type engine with a small piston displacement but larger valves, the exhaust valves being located relatively close to the spark plugs, while the inlet valves are on the opposite side of the combustion chamber. The cylinder head incorporates the combustion chambers, spark plugs, valve inlet and exhaust ports and water passages.

A new type of frame called "YK" consists of two side rails, front and rear cross members, engine side support tie bar, and a new subframe member tied in by strong gusset members and terminating in a braced channel member. The subframe members simulate the letter Y, and the second cross member with its braces the letter K.

Chevrolet's wheelbase has been increased from 110 to 112 inches, and engine horsepower stepped up from 65 at 2800 revolutions to 80 at 3300 revolutions.

With this more powerful motor, even though the dimensions are unchanged at 3 5/16 x 4 inches, Chevrolet will stress pickup and top speed more vigorously this year. There are now five engine supports, of rubber, insulating the chassis.

Pontiac's front springs as noted are similar to Chevrolet. Its wheelbase has been increased from 115 inches to 117¼. It also has the new YK box girder frame. Brake drums are of high carbon manganese alloy steel with corrugated exterior rims which increase the air cooling surface. Engine dimensions remain the same, but compression has been increased. The motor block is slightly longer to provide greater water jacketing.

Nash has revived the name Lafayette, once given to a large car manufactured by a subsidiary at Indianapolis, to the low-price car it introduced at the New York show Saturday. The Lafayette is being assembled at the Racine plant of Nash.

Edward G. Budd Mfg. Co., Philadelphia, has added Count Alexis de Sakhnoffsky to its body designing staff with the title of engineering stylist, indicating Budd's recognition of the trend toward streamlining. Recently, Chrysler announced the addition of Count Seversky to its staff in a similar capacity. Budd, incidentally, is moving some equipment from Philadelphia to Detroit and will be a bigger factor in the Detroit steel market.

Eaton Mfg. Co., Cleveland, expects shortly to complete arrangements for control of important foreign developments in "fluid flywheels" to be used in conjunction with a new type of gear box. The "fluid flywheel," also known as a "hydraulic coupling" is in effect an automatic gearshift and is used increasingly abroad.

Died:

STEWART JOHNSTON, founder and chairman of Pittsburgh Steel Foundry Corp., Glassport, Pa., in Pittsburgh, Dec. 30. Born in Pittsburgh in 1865 and graduated from Renssellaer Polytechnic institute, Troy, N. Y., he began his career with Pittsburgh Steel Casting Co. as a draftsman. A year later he became assistant superintendent of the company, then superintendent in 1889 when the company was absorbed by the American Steel Casting Co. After the merger, he was chosen president of the Pittsburgh Steel Casting Co. division, but in 1898 he organized the Pittsburgh Steel Foundry Co. and was made its first president, remaining in that position until April, 1925, when he was elected chairman of the board in the reorganization of the company into a corporation. He was a member of many Pittsburgh clubs and a trustee of Rensselaer Polytechnic institute.

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Charles R. Tamlyn, 48, treasurer and assistant secretary, Illinois Steel Co., in Chicago, Dec. 24.

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George E. Nye, president, Nye Steam Pump & Machine Co., Chicago, in that city, Dec. 24.

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George R. Lyon, 32, research engineer for the Darling Valve & Mfg. Co., Williamsport, Pa., in Chicago, Dec. 30.

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N. G. Robertson, 70, president of the Wyoming Shovel Works, Wyoming, Pa., at his home in Waverly, Pa., Dec. 19.

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Isaac Marks, 52, vice president, Henry Marks Sons, metal and machinery dealers, Indianapolis, in Indianapolis, recently.

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John M. Ewen, engineer for many of the first buildings of steel construction erected in this country, in Washington, Dec. 19.

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William E. Woodwell, 76, president, Joseph Woodwell Co., Pittsburgh, hardware and mill supplies, in Pittsburgh, Dec. 31.

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Eranious Rice, 81, president of the Cleveland Metal Stamping Co., Cleveland, at his home in Lakewood, O., Jan. 2, after a year's illness.

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David Edward Skinner, 66, president, Skinner & Eddy Corp., Seattle, at his home there, Dec. 27. Born in Michigan, he went to the Pacific coast in 1902 and in 1916 with John W. Eddy established the Skinner & Eddy shipyards which, during the war, built over $100,000,000 worth of steel ships in record time for the government. He was prominent in industrial and civic affairs of Seattle.

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Andrew Squire, 83, senior partner of Squire, Sanders & Dempsey, legal counsel for steel companies, Great Lakes shipping interests and mining companies, in Cleveland, Jan. 5.

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William P. Schaufele, 64, assistant secretary of the boat interests of the M. A. Hanna Co., Cleveland, at his home in Lakewood, O., Jan. 1, after a short illness. He had been with the Hanna company 27 years.

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Robert A. McGill, 56, manager of the Indiana branches of Crane Co., Chicago, at his home in Indianapolis, recently, after an illness of several months. His father formerly was vice president and treasurer of Crane Co.

□ □ □

John J. Glennon, former superintendent of the American Brake Shoe & Foundry Co. plants in Bloomfield and Mahwah, N. J., and Uniontown, Pa., in an Arlington, N. J., hospital, Dec. 31. He was president of the J. J. Glennon Foundry Co., Kearny, N. J.

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James H. Slocum, at one time identified with the Homestead works of Carnegie Steel Co. and later, in 1901, secretary to W. E. Corey, president of the United States Steel Corp., in Montclair, N. J., Jan. 2. He was the father of Roy Slocum, identified with the Universal Atlas Cement Co., also a subsidiary of the Steel corporation.

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John H. K. Shannahan, 53, for nearly 30 years associated in various capacities with the Bethlehem Steel Co., Sparrows Point, Md., at his home there, Jan. 2. Born in Boston, Md., he was graduated from Western Maryland college and became secretary to Frederick C. Wood, then president of the Maryland Steel Co. When Bethlehem took over Maryland Steel he was made superintendent of orders and held that position until his death.

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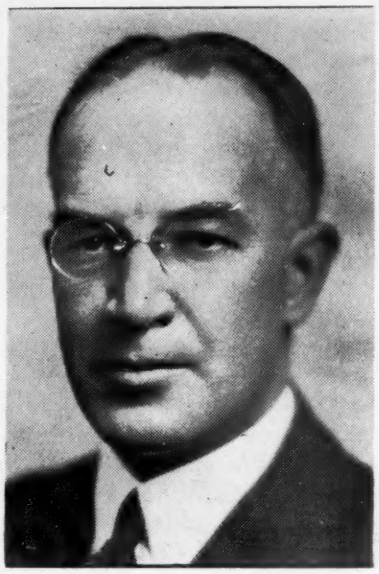
David Kendall, 68, general manager, Alliance Machine Co., Alliance, O., in Hartford, Conn., Jan. 2. Coming to this country from England in 1887, he first was associated with the Morgan Engineering Co. in Alliance, advancing to general manager. In 1901 he resigned and became affiliated with the newly formed Alliance Machine Co. Internationally known in the steel industry, he was instrumental in the development of electric overhead cranes and took an active interest in development of forging equipment.

Industrial Men in the Day's News

William I. Howland Jr., Vice President in Charge of Sales, Illinois Steel Co.



Graduate of Yale university in mechanical engineering, his career has been centered with one company.

From an early position in the operating department he was transferred to sales, where he has spent 20 years.

During the war he served the navy and later returned to steel sales, rising to assistant general manager.

WILLIAM I. HOWLAND JR., whose 25 years in the steel industry have been spent entirely in the service of the Illinois Steel Co., on Jan. 1 became vice president in charge of sales, succeeding Edwin S. Mills who as noted in STEEL for Jan. 1 resigned following a long siege of ill health.

Mr. Howland joined the Illinois Steel Co. in 1908, following his graduation from Sheffield Scientific school of Yale university, New Haven, Conn., with a degree in mechanical engineering. His first position was in the operating department of the South Chicago works. In 1913 he was transferred to the sales department, devoting his time to the sale of electric and alloy steels. Three years later he represented the Carnegie Steel Co. as well as Illinois interests, at Chicago, in the sale of these products.

During the war he served in the navy department, and in 1919 returned to his former position. He was soon made assistant to the assistant sales manager in charge of bars, strip and alloys.

Since 1926 he has been assistant general manager of sales.

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T. E. Millsop, formerly assistant to the president of Weirton Steel Co., Weirton, W. Va., has been elected a vice president of the company. Other Weirton changes effective Jan. 1 are:

E. J. Anglin, formerly superintendent of steelworks, has been appointed general superintendent, to succeed G. W. Vreeland. The former has been affiliated with the company for 19 years.

J. S. Williamson has been appointed assistant general superintendent; H. E. McDonnell manager and M. Guirand assistant manager of the steelworks.

E. R. Church has been named superintendent of blooming mills, and A. M. Baker superintendent of blast furnaces.

Henry Rudolph has been appointed assistant superintendent of blast furnaces, and Luther Renfrew assistant superintendent of the company's coke works.

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Alex L. Moll was named manager of sales of the strip steel division of Acme Steel Co., Chicago, effective Nov. 1, to fill the vacancy caused by the resignation of Donald MacMurray.

J. E. Resor was chosen assistant manager of sales of the strip steel division, effective the same date.

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William P. Gleason, for 25 years general superintendent of the Illinois Steel Co. works at Gary, Ind., has retired and is planning a trip around the world. He began work 30 years ago in the first steel mill in Gary.

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W. H. Eisenman, secretary of the American Society for Metals, formerly the American Society for Steel Treating, Cleveland, was re-elected for the fifth time as president of the Association of Exhibit Managers at a recent meeting of the latter organization. The association's membership includes trade association secretaries and managers of large industrial exhibits.

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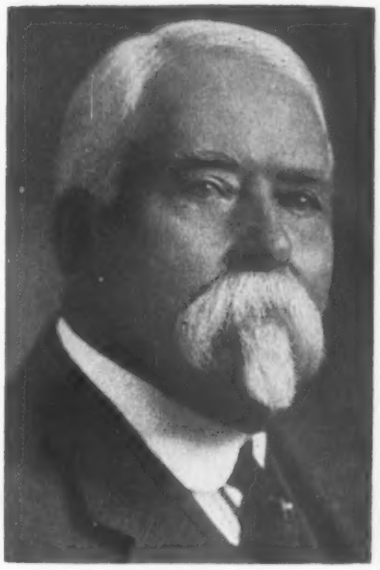
WILLIS LARIMER KING, vice president and member of the executive committee of the Jones & Laughlin Steel Corp., Pittsburgh, has resigned, but will continue to serve as member of the board of directors. Regarded affectionately as the dean of the American steel industry, he has been active with Jones & Laughlin for 64 of his 83 years, during which time the company's production has expanded from 30,000 tons of puddled iron annually to the present capacity of 3,600,000 tons of steel ingots.

Mr. King was one of the founders and a vice president since its inception of the American Iron and Steel institute, and in May, 1933, was awarded the Gary memorial gold medal of the institute for "outstanding achievement as a leader in inspiring high ideals and promoting confidence and goodwill in the welfare of the iron and steel industry." Born in Pittsburgh, he has lived there all his life, and is a graduate of Washington and Jefferson college, Washington, Pa.



Willis L. King

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S. S. Bruce, traffic manager, Koppers Co., Pittsburgh, has been elected a director of the Koppers Products Co.

EDITORIAL

NRA Red Tape Too Costly For Small Industries

SEARCHERS of the President's annual message for clues to his future policies found few of definite character. The nearest approach to a hint of the administration's attitude toward industry appeared in the following paragraph:

> "Under the authority of this congress, we have brought the component parts of each industry together around a common table, just as we have brought problems affecting labor to a common meeting ground. Though the machinery, hurriedly devised, may need readjustment from time to time, nevertheless I think you will agree with me that we have created a permanent feature of our modernized industrial structure and that it will continue under the supervision but not the arbitrary dictation of the government itself."

Three points in this statement are significant. First is the assumption that the machinery of governmental supervision is "permanent." Second is the admission that it "may need readjustment." Third is the belief it will continue "under the *supervision but not the arbitrary dictation* of the government itself."

It is risky to ascribe permanency to any work of man. It is our guess that some of the principles of NRA will live longer than any part of its machinery. Moreover, it is likely that the machinery, while assuredly in need of readjustment, as suggested by the President, in a relatively brief time will undergo considerable change and within a decade will disappear or be altered so much as to be unrecognizable.

Hope President Intends To Hold Radical Element in Check in NRA Activities

As for the statement that industry will continue under the supervision but not the arbitrary dictation of the government, all industry hopes that this means that the attempts of Washington fanatics to arbitrarily dictate will be held under better control in the future than in the past.

The grief attending the approval of a code under present conditions is not generally realized. NRA machinery is judged largely on the basis of its efficiency in handling the steel, automobile, cotton textile and other codes of large industries. Few persons realize how badly the codes of small industries are mishandled or to what extent the codemakers of such industries are at the mercy of the whims of minor representatives of strong factions in Washington. During the past few months scores of secondary industries have been obliged to rewrite their codes from 12 to 20 times.

Before its code is presented in public hearing, each industry must negotiate with the labor, consumer, industry, and planning and research advisory boards and with the legal division of NRA. After agreement with these five agencies is reached, the code goes to public hearing. Following this, the industry again consults the five agencies, and, if agreement on changes is reached, the code, together with the reports of all advisers, is submitted to the assistant deputy administrator who conducted the hearing. If all is in order, he passes it to the deputy administrator, who turns it over to a committee of sleuths for fine-combed scrutiny. If it passes this gauntlet, it goes to Administrator Johnson, who approves it or recommends its approval by the President.

Eleventh-Hour Changes Play Havoc with NRA Machinery, Retard Codemaking

This procedure would work fairly well if it were not for the penchant of certain minor officials for introducing trivial changes after a code has been approved. This necessitates the resubmitting of the code to the entire circle of critics, and, more often than not, the one change leads to others, so that the entire procedure has to be repeated not only once, but sometimes many times.

The real tragedy is that the expense of the unnecessary delay and confusion is thrown upon small industries, the members of which can ill afford to pay such a price for the whims, mistakes and malice of certain fanatics who infest part of the NRA machine.

Therefore, we hope that the President means what he says when he suggests that NRA "may need readjustment" and that his distinction between "supervision" and "arbitrary dictation" may lead to steps which will protect the smaller industries, whose codes now are under consideration, from needless bullyragging and expensive bickering.

If NRA is to be as satisfactory to small industries as it is to the large, basic industries, the machinery for code approval must be altered to give fairer treatment to the smaller groups. The Roosevelt policy of giving radicals plenty of leeway, as a form of safety valve for their fanaticism, may be good tactics, but the burden should not be permitted to fall too heavily upon small businesses.

THE BUSINESS TREND

Business Indecisive Before Gaining Stride for 1934

REPORTS for business in the final weeks of the old year continue to bear out the earlier evidence that the slackening of activity during the holiday period was less pronounced than in any of the previous depression years.

Car loadings in the week ending Dec. 23 were above those of the corresponding weeks of 1932 and 1931, although differences in the position of Christmas day in the weeks make accurate comparisons impossible.

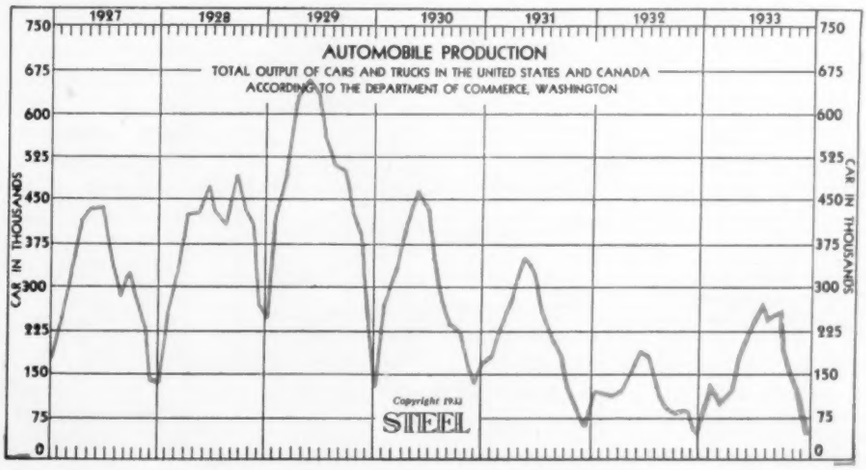
Steelworks operations at the end of the year were at a higher rate than at the end of 1932, 1931 and 1930. Release from the pressure of completing fourth-quarter shipments before the Dec. 31 deadline occasioned a drop in the rate from 38 in the week ending Dec. 30 to the lower thirties in the week ending Jan. 6. Thus, in the second week of the new year, the rate is well above the corresponding rates of 1932 and 1933. The next few weeks will afford interesting evidence as to the extent to which the code requirement for completing shipments in the quarter specified has affected the trend of operations.

Figures on the output of pig iron and steel ingots in December show gains which indicate that the downward trend from the July peak was arrested and reversed in November. Here again the reports of January will be required to show definitely how much of the December improvement was due to the artificial factor of hurried shipments under the code and how much was due to real expansion in demand.

Improved Sentiment Accompanies Business In Its Entry Into Unknown of 1934

With few exceptions, forecasts of industrial leaders and economic experts for business in 1934 were optimistic. To a large extent they reflect the easier feeling which prevails generally throughout industry. However, part of this bouyancy goes no deeper than a profound confidence in President Roosevelt—it is in effect a psychological structure to bridge the first few weeks of the new year, until the events of 1934 establish a definite trend.

The reaction of commodity prices to the gold program is disappointing. Monetary policy will continue to be a live problem in the first quarter.

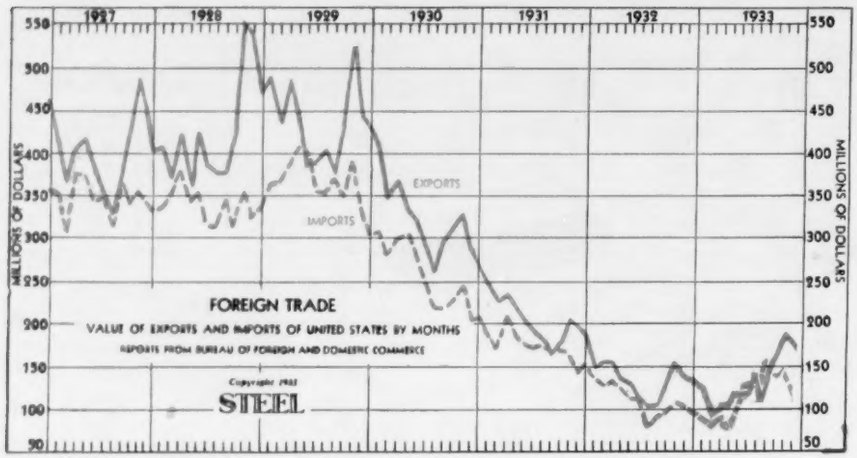


1933

Nov.	66,195
Oct.	142,157
Sept.	201,890
Aug.	242,566
July	239,628

1932

Nov.	61,761
Oct.	51,625
Sept.	86,492
Aug.	94,392
July	116,615



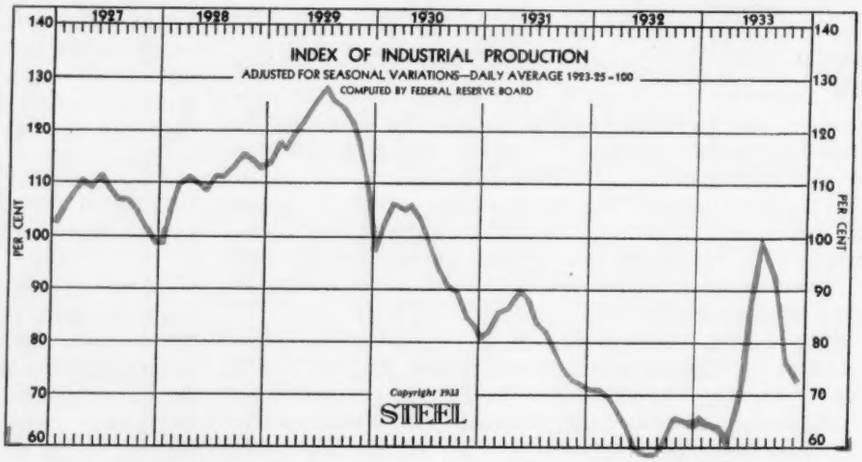
Exports		Imports	
November, 1933	$184,000,000	November, 1933	$128,000,000
October, 1933	193,734,000	October, 1933	150,856,000
November, 1932	138,834,000	November, 1932	104,468,000

November Foreign Trade Off Slightly; Trade Balance Holds

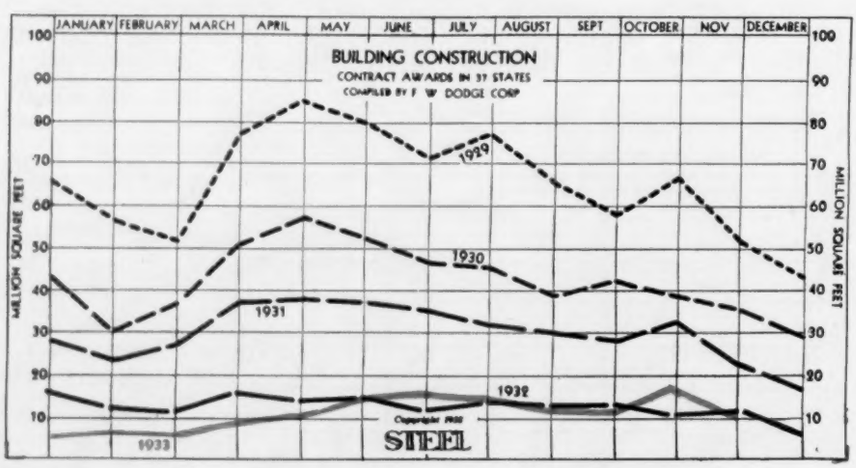
Both exports and imports of merchandise declined in November compared with the preceding month but were considerably above the level reported for November, 1932. The total value of goods exported in November was $184,000,000, while imports declined to $128,000,000 leaving a favorable trade balance of $56,000,000. The excess of exports over imports in the eleven months of 1933 was $167,267,000, which compares with $253,715,000 in the same period of 1932.

Industrial Production Declines For Fourth Consecutive Month

Industrial production in the United States during November declined 4 points from the revised figure of the preceding month. While this was the fourth consecutive monthly fall the index was considerably above the level of November, 1932. According to the monthly report of the Federal Reserve board the index for November was 73. This compares with 77 in October and 65 in November, 1932. The November index was the lowest for any month since last April.



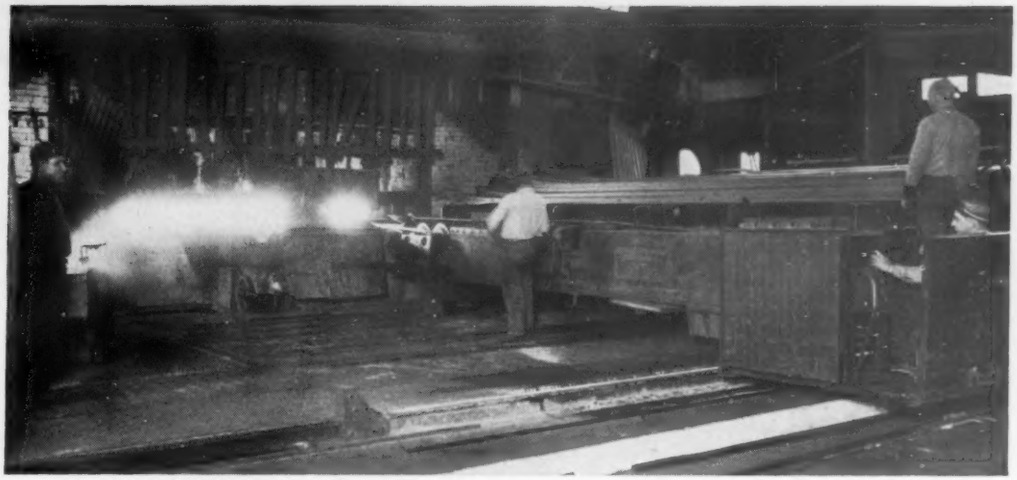
November, 1933	73
October, 1933	77
November, 1932	65



	Square Feet
November, 1933	11,762,300
October, 1933	15,534,700
November, 1932	12,068,100

Building Construction Declines Sharply in November

Building awards as measured in new floor space in 37 eastern states declined nearly 4,000,000 square feet in November. According to the latest report of the F. W. Dodge Corp., total construction for the eleventh month involved 11,762,300 square feet as compared with 15,534,700 in October. Since May, the 1933 trend has followed very closely that of the preceding year and the aggregate for the eleven months shows 1933 lagging both in new floor space and valuation.



CHARGING 30-foot lengths of skelp into regenerative type gas-fired furnace. Hot skelp is withdrawn from opposite side of furnace and pulled through a die to form pipe. The charging machine is provided with magnetic rolls to convey the skelp into the furnace

BUTTWELD PIPE PLANT ARRANGED TO ELIMINATE BACKTRACKING

BY J. B. NEALEY

ONE of the earliest methods for the manufacture of steel pipe, and still in wide use, is the buttweld process, in which long strips of skelp are heated and pulled through a bell-mouthed die, the smaller end of which is of the same size as the pipe to be formed. The hot skelp is curled and forced into a tube shape as it is pulled through the die, the edges being forced together in a butt weld.

Pipe ranging from ¼ to 3 inches in diameter is made by this method, the various steps being as follows: (1) Point and form ends of skelp cold; (2) heat skelp in gas fired furnace; (3) pull hot skelp through bell-shaped die in draw bench, thus forming pipe; (4) round and size the pipe in rolls and on same heat; (5) cool in rack; (6) straighten in skew rolls; (7) hot saw into proper lengths; (8) inspect and test under 700-1200 pounds water pressure.

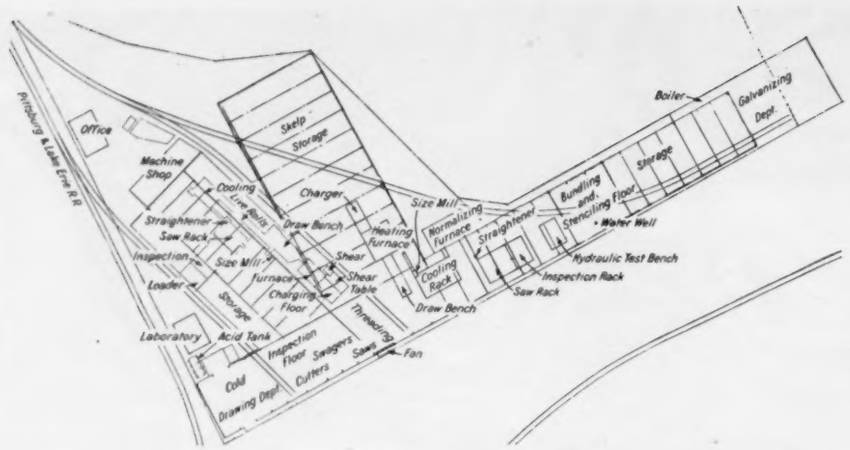
This procedure is followed by the Pittsburgh Tube Co. at its Monaca, Pa., plant. There are two long main buildings, the first joining the second in a sort of Y, equipment being installed for progressive straight-line production with no backtracking of work. Material is handled through the various steps by overhead cranes with hoists, running the entire length of both buildings. Railroad spurs serve the skelp yard and both buildings. The skelp yard sets in the angle between the two buildings, as shown in an accompanying illustration.

Two pipemaking units with furnaces are provided. The furnace of the first unit is of the regenerative type, 28 feet square. It has horizontal slots in both sides and the skelp is charged and discharged through these slots.

On one side is a motor-driven charger operating back and forth on a track. Before charging, the skelp is dropped by crane upon a shear table where the ends are pointed and then curved to facilitate entrance into the die. The charger is 25 feet long and is operated by two men. One puts the 30-foot skelp, piece by piece, upon rotating magnetic rolls which convey the material into the furnace. The other man operates the charger back and forth so that the skelp is distributed evenly over the furnace hearth.

Heat is supplied through 32 gas burners, 16 in each side. With air for combustion drawn through hot checkers, the burners on each side fire at alternate intervals. Gas is carried along each side of the furnace by a 5-inch manifold and is fed to the burners by 1¼-inch pipes. Temperature control is aided by the use of recording pyrometers. The furnace serving the second pipemaking unit is similar to the one just described, except that it is smaller, 15 x 25 feet, and is fired by only 24 burners.

On the opposite side of the furnace from the charger is a 35-foot draw bench operating back and forth on a track. One operator positions the bench while the other picks up the skelp with tongs and hooks the end in the draw bench where it is pulled through the die. After siz-



Layout of pipe manufacturing plant, indicating how equipment is installed to avoid backtracking of the product

ing in rolls and subsequently cooling on the rack some of this pipe is taken out of the regular line of production by transfer rolls and is normalized. The normalizing furnace, shown in an accompanying illustration, is continuous in operation, of the walking-beam type, and is fired with gas fuel. It measures 15 x 25 feet and is equipped with 20 burners. Of the latter, 12 are located on one side close to the roof so that they overfire the work, while the remaining eight are located low down on the opposite side and underfire the work.

Controllers Regulate Fuel

Burners are of the inspirator type, high-pressure gas being used to inspirate air for combustion. The furnace temperature is regulated by two automatic potentiometer-type recording controllers connected to three-position, motor operated valves, cut into the gas manifold supplying the burners on each side.

Pipe is carried through the furnace at the proper speed by seven mechanically operated walking beams which operate through slots in the hearth. The normalized work drops out, on the discharge side, onto skids and is carried through straightening rolls back into the main production line.

In the second building also is located equipment for cold drawing, inspection, testing, galvanizing, threading and painting, the pipe being transferred to various divisions by crane.

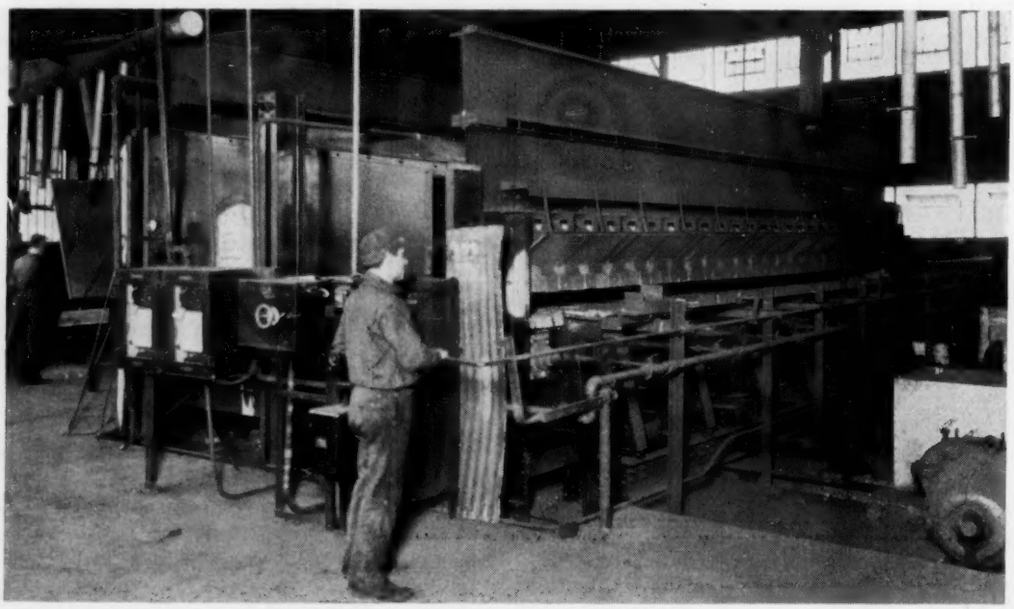
The galvanizing division contains four pickle vats, one galvanizing tank and a water vat for cooling. A bundle of work is placed by crane on a rack and an operator handles the pipes in and out of the molten zinc, one at a time, with hand tongs. To remove the pipe from the bath he simply pushes the end through a blow ring and touches it to a pair of magnetic rolls. These rolls draw it clear out of the bath over a line of rollers and all excess zinc is blown off by compressed air as the pipe passes through the perforated blow ring. Another operator pulls it clear of the rolls, blows steam through to clean the inside and then rolls it down inclined skids into the water tank for cooling. From here it is picked out by crane and passed through straightening rolls.

The galvanizing tank, set in a brick furnace, is 24 feet long, 4 feet deep and 42 inches wide. It is fired by 38 gas burners, 19 on a side, of the high-pressure inspirator type. They fire through tunnels directly onto beds of refractory material so as to produce incandescence. These beds are enclosed in small chambers open at the top and spaced 4½ inches from the pot wall. The heat rises and enters the open space next to the pot wall and is drawn down into a flue below which connects with a stack. In this manner, almost the entire surface of both pot walls is subjected to high heat without flame impingement.

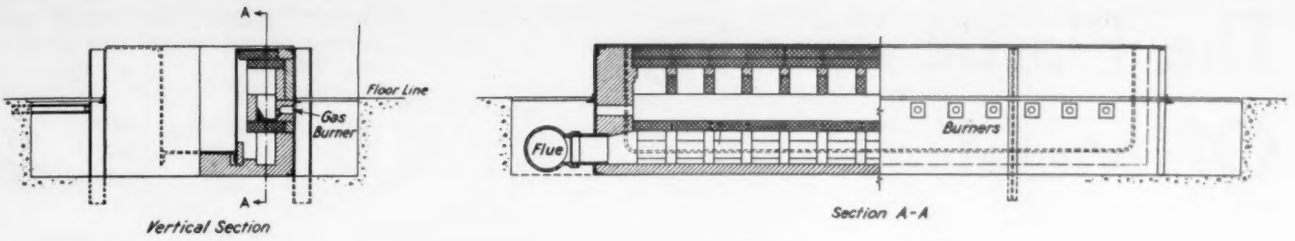
Radiation and Convection

Radiation from the refractory beds promotes complete combustion in the smallest space and shortest time. While the furnace walls facing the kettle or pot radiate considerable heat to the kettle walls, most of the heat input to this tank is by convection, since the distance between the furnace and kettle walls was designed to provide the greatest velocity for the products of combustion passing through. This method provides material savings in fuel, labor and dross accumulation, increases production and tank life, and improves the quality of the product.

Hardening and sizing are accomplished by cold working, some of the pipe being redrawn cold. Mechanical imperfections are detected by drawing the pipe slowly through a magnetic tester which automatically plots a curve on a chart. Fluctua-



CHARGING side of walking beam type gas normalizing furnace for handling small sizes of buttweld steel pipe. Temperature control equipment is shown in the left foreground



SECTIONAL drawings of galvanizing tank and furnace, showing how gas burners fire onto refractory bed, heating the bath by convection and radiation

tions in this curve denote imperfections and the material is rejected.

Steam used in the plant is made in a gas-fired tubular boiler, automatic and continuous in operation.

In addition to an engineering department, the company also has two laboratories, chemical and physical, where both incoming and finished material is checked carefully.

Alloys Offer Impressive Possibilities In Fields of Transportation

FORESEEING widespread advances in highway, air, and water transportation through further development of new alloy steels and alloys of light metals, the automotive industries are joining the iron and steel industries in a co-operative program of research under auspices of the Engineering Foundation, research agency of the national engineering societies.

A new area of impressive possibilities is believed to be opening up, and the future of the automotive industries, the largest users of high-grade alloy steels, will, it is held, be largely influenced by acceleration of scientific progress in this field.

Many Organizations Interested

General Motors Corp. has become a participant in the enterprise, already sponsored by 68 steel companies and other organizations including the American Iron and Steel institute, technical societies, research institutes and government bureaus.

Aided by subscriptions totaling $230,000, a committee of the Foundation headed by Prof. G. B. Waterhouse, Massachusetts Institute of Technology, is carrying out at the Foundation's headquarters in New York; at Battelle Memorial institute, Columbus, O.; and at the bureau of standards, Washington, the task of collecting, reviewing, and appraising critically all of the research on iron and its alloys reported in technical literature of the world.

As study progresses, the automotive and steel industries will be supplied with information in successive divisions of the subject on which to base attacks on their own problems in the light of all previous research.

The use of high-grade alloy steels in the new spring suspensions of the 1934 model cars is cited as an illustration of the importance of the Foundation's research to the automobile manufacturer and owner. This research looks to the development of special alloy steels of strength and other qualities in a higher degree than are now available.

Through perfection of present alloy steels and development of new ones having new properties or greater excellence, airplanes, automobiles, trucks and motorized agricultural and construction equipment of many sorts may have higher performance with out increase of weight or the same performance with less weight. Further applications of the stainless steels indicate other lines of progress, according to engineers.

Pathway to Progress

"Without alloy steels," says a statement by the Foundation, "the progress of mankind would have been retarded. There would be no automobiles and no airplanes, as we know them today. Many machines, structures and processes would have been impracticable. Hundreds of articles in daily use could not be made, or would cost much more.

"Alloy steels have found their greatest application where high strength or toughness, and resistance to corrosion are necessary, as in the automobile and aircraft industries, which together use nearly 80 per cent of all the alloy steel made.

"The first alloy steel was manufactured commercially less than 50 years ago, when an English scientist added manganese to ordinary steel. This new alloy had such remarkable properties that soon many other investigators were experimenting with additions of other metals. The result was the long list of alloy steels known today; steels containing manganese, silicon, nickel, chromium, vaadium, tungsten, cobalt, copper, aluminum, and other metals, either used alone or in combinations of two or more.

"Alloy steels have two outstanding advantages. Most of them are stronger and a large number of them resist rusting, staining and other forms of corrosion much better than common steel. Many of the alloy steels now used combine both advantages. Alloy steels cost more than common steel, but for many purposes they are worth more; for some uses they are indispensable. It depends upon the service which is expected of them."

Await Tungsten Monograph

Two divisions of the study have been completed and published by the Engineering Foundation under the titles "Alloys of Iron and Molybdenum," and "Alloys of Iron and Silicon." A third, dealing with alloys of iron and tungsten, which include all steels and cast irons containing tungsten, will appear shortly.

Many of the steel companies participating in the research make a very large amount of high grade alloy steels for the automotive industries. They include: American Rolling Mill Co.; Bethlehem Steel Co.; Crucible Steel Co. of America; Firth-Sterling Steel Co.; Jones & Laughlin Steel Corp.; Midvale Co.; Pittsburgh Steel Co.; Republic Steel Corp.; Vanadium-Alloys Steel Co.; United States Steel Corp.

Other participants are: Alan Wood Steel Co.; American Electrochemical society; American Foundrymen's association; American Institute of Electrical Engineers; American Institute of Mining and Metallurgical Engineers; American Iron and Steel institute; American Society of Civil Engineers; American Society of Mechanical Engineers; American Society for Metals (American Society for Steel Treating); American Society for Testing Materials.

Babcock & Wilcox Co.; Baldwin Locomotive Works; Battelle Memorial institute; Buckeye Steel Castings Co.; Bucyrus-Erie Co.; bureau of mines; bureau of standards; Car-

(*Please turn to Page 45*)

The Plastic Forming Of Metals

By PROFESSOR DR.-ING. ERICH SIEBEL
Translated by JOHN H. HITCHCOCK

Part II—Forces and Flow of Material in Technical Forming Processes

4. Useful and Friction Work in Rolling (Continued)

IF THE diameters of the two rolls differ considerably from one another, as is the case in rolling mills in which a small working roll is used, the length of contact between bar and rolls is given by the approximate equation:

$$l_d = \sqrt{\frac{2 r_1 \times r_2}{r_1 + r_2} \times \Delta h} = \sqrt{r_m \times \Delta h}^{*} \quad \ldots\ldots (41).$$

This equation differs from the relation obtained for equal roll diameters (equation 32) in the respect that an average value, r_m, of the radii, r_1 and r_2, is used, instead of the common radius, r, of the rolls.

In this case also, the assumption that the resultant force exerted by the bar is applied at the lever arm $a = \frac{l_d}{2} \times \frac{l_m}{l_d}$, appears to be upheld.

In the absence of external forces in the longitudinal direction, the forces against the two rolls must be equal and oppositely directed, so that the angle of inclination of these forces is changed according to the loading relations of the two rolls. If the upper roll operates as an idler, assuming frictionless bearings, the resultant force must be directed through the center of that roll, as shown in Fig. 64. The torque of the lower roll which corresponds to the useful power for rolling, neglecting the smaller thickness of the bar in comparison to the roll diameter, is given in this case by the relation:

$$M = D \times a \times \frac{r_1 + r_2}{r_1} \quad \ldots\ldots (42).$$

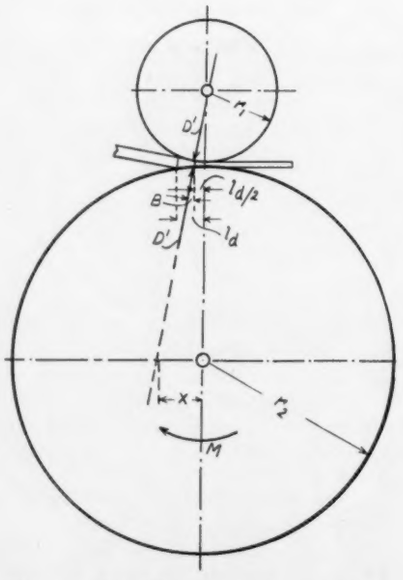


Fig. 64—Equilibrium of forces during rolling with an idler roller

The pure rolling power, wholly independent of the method of driving, is calculated as:

$$L_w = D \times a \times \omega_1 \times \frac{r_1 + r_2}{r_2} = D \times a \times \omega_2 \times \frac{r_1 + r_2}{r_1} = 2 D \times u \times \frac{a}{r_m};$$

and the pure rolling work as:

$$A_w = D \times a \times \frac{l_1}{r_1} \times \frac{r_1 + r_2}{r_2} = D \times a \times \frac{l_1}{r_2} \times \frac{r_1 + r_2}{r_1} = 2 D \times a \times \frac{l_1}{r_m}$$

(approximately).

Even with widely differing diameters of upper and lower rolls, definite relations, therefore, exist between the separating force and the pure rolling work and rolling power respectively, which differ from the conditions derived for equal roll diameters, equations (39a) and (39b), only in the respect that r_m is used instead of r.

Work Is Measured Directly

After the relations between the separating force and the useful power and pure rolling work have been established in the manner previously described, the useful power and useful work can be measured directly in rolling tests, in addition to the total power and total work; or, they can be calculated from the measured separating force. The power loss, on the other hand, can be determined only indirectly as the difference between the total power and the useful power. Investigation is simplest in blooming, sheet, universal, strip, and cold-rolling, because bars of rectangular cross section always are rolled in such mills, and the determination of contact length and the contact area is therefore simple. In rolling shapes, on the contrary, it is necessary to resort to graphical determination of the contact area and of the center of gravity of that area, unless an approximate calculation suffices.

This test method first was used for the purpose of testing various cold-rolling mills, in order to determine the distribution of the total power delivered from the motor into rolling power and power loss. The tests described in Part II, section 2 on a cold-rolling mill (A) first were evaluated for this purpose.[45]

The results of the rolling tests with soft strip steel 2.36 inches wide are summarized in Table V. The contact length, shown in column 4, was calculated according to equation (32). The lever arm at which the resultant force acts, as tabulated in column 5, was calculated from equation (40b). From these values and the measured separating force (column 6), the torque necessary to provide the power for rolling then is determined, as shown in column 7. From the observed rotating speed of the

*The length of contact between bar and rolls is determined in the following manner. For the curvature of the roll periphery in the contact region, the differential equation, $\frac{d^2y}{dx^2} = \frac{1}{r}$, holds with close approximation. The slope of the roll surface, obtained by integration, is represented by the equation:

$$\frac{dy}{dx} = \frac{x}{r} + C_1.$$

For $x = 0$, $dy/dx = 0$, and $C_1 = 0$. The second integration, which expresses the distance of the roll surface from the horizontal, provides the relation:

$$y = \frac{x_2}{2r} + C_2.$$

Here $C_2 = 0$, and because $x = 0$, then y also must be zero. For the change of thickness Δh of the strip, the equation now can be established:

$$\Delta h = y_1 + y_2 = \frac{l_d^2}{2 r_1} + \frac{l_d^2}{2 r_2}$$

and the length of contact is found to be:

$$l_d = \sqrt{\frac{2 r_1 r_2}{r_1 + r_2} \times \Delta h}.$$

Table V

Cold Rolling Tests on Rolling Mill A*

Pass No.	Thickness Initial inches (1)	Thickness Final inches (2)	Reduction per cent (3)	Length of Contact inches (4)	Lever Arm of Separating Force inches (5)	Separating Force pounds (6)	Rolling Torque ft. lbs. (7)	Roll speed r.p.m. (8)	Rolling power kilowatts (9)	Motor power kilowatts (10)	Power Loss Absolute kilowatts (11)	Power Loss Relative per cent (12)
					(a) Without Lubrication of Material.							
Test Series I—Reduction About 10 Per Cent.												
1	0.0768	0.0689	10.3	0.1665	0.0787	39,300	514	36	2.6	6.2	3.6	58
3	0.0622	0.0559	10.1	0.1492	0.0705	42,400	500	36	2.55	6.5	3.95	61
5	0.0500	0.0449	10.2	0.1343	0.0634	44,100	467	36	2.4	6.5	4.1	63
7	0.0402	0.0358	10.8	0.1236	0.0583	43,200	420	36	2.15	7.1	4.95	70
9	0.0319	0.0280	12.3	0.1181	0.0551	51,200	471	36	2.4	8.6	6.2	72
11	0.0248	0.0220	11.1	0.0988	0.0465	58,000	452	36	2.3	11.2	8.9	79
Test Series II—Reduction About 15 Per Cent.												
1	0.0768	0.0649	15.4	0.2040	0.0937	45,900	716	36	3.65	11.5	7.85	68
3	0.0551	0.0465	15.7	0.1744	0.0799	53,400	709	36	3.6	14.0	10.4	74
5	0.0388	0.0329	15.3	0.1445	0.0661	58,500	644	36	3.25	14.2	10.95	77
7	0.0278	0.0238	14.2	0.1177	0.0543	66,600	604	36	3.05	16.0	12.95	81
Test Series III—Reduction About 20 Per Cent.												
1	0.0768	0.0614	20.0	0.2323	0.1035	54,500	937	36	4.65	13.5	8.85	65
3	0.0492	0.0398	20.0	0.1823	0.0815	62,700	854	36	4.25	15.2	10.95	72
5	0.0319	0.0260	18.5	0.1441	0.0653	73,000	792	36	3.9	20.1	16.2	81
					(b) With Lubrication of Material.							
Test Series IV—Reduction About 15 Per Cent.												
1	0.0768	0.0649	15.4	0.2036	0.0933	40,600	630	36	3.2	7.6	4.4	58
3	0.0551	0.0461	16.4	0.1784	0.0815	46,100	630	36	3.2	8.4	5.2	62
5	0.0378	0.0319	16.5	0.1488	0.0685	46,100	525	36	2.65	7.1	4.45	63
7	0.0268	0.0236	11.8	0.1051	0.0492	39,900	329	36	1.7	5.3	3.6	68

*Roll diameter = 7.09 inches.

rolls (column 8), the angular velocity is determined. The rolling power, in foot pounds per second, is given, according to equation (39a), as the product of angular velocity and torque. The rolling power, determined in this way and converted into kilowatts, is indicated in column 9. Column 10 gives the motor power according to the records of the wattmeters. The absolute power loss (column 11) is the difference between the total power and the rolling power. In column 12, the relative proportion of the power loss to the total power is determined.

A further investigation was carried out on a high-capacity 4-high mill, B, with a driven lower working roll 8.27 inches diameter and an upper working roll of 3.15 inches diameter which ran as an idler, the separating force being carried by two backing rolls of 6.30 inches diameter. The roll arrangement is shown in Fig. 65. The backing rolls ran in roller bearings, while the lower working roll was carried in water-cooled sliding bearings. All bearings in this case were provided with oil lubrication under pressure. The lower roll was driven, through a double gear reduction, by a multiphase motor with a power rating of 20 kilowatts at 960 revolutions per minute. The roll speed was about 81 feet per minute. The total rolling power and the separating force were measured with equipment previously described. As test material, soft steel strip of varying thickness, from 2.36 to 5.31 inches wide, was provided in coils of about 110 pounds weight. The rolled material was lubricated during rolling with a mixture of nine parts of kerosene and one part of oil.

Since the test evaluation in this case follows a somewhat different form, the results of the observations on the latter rolling mill are reproduced in Table VI. The arrangement of the table corresponds to that of Table V. The calculation of the length of contact, in column 4, is made in

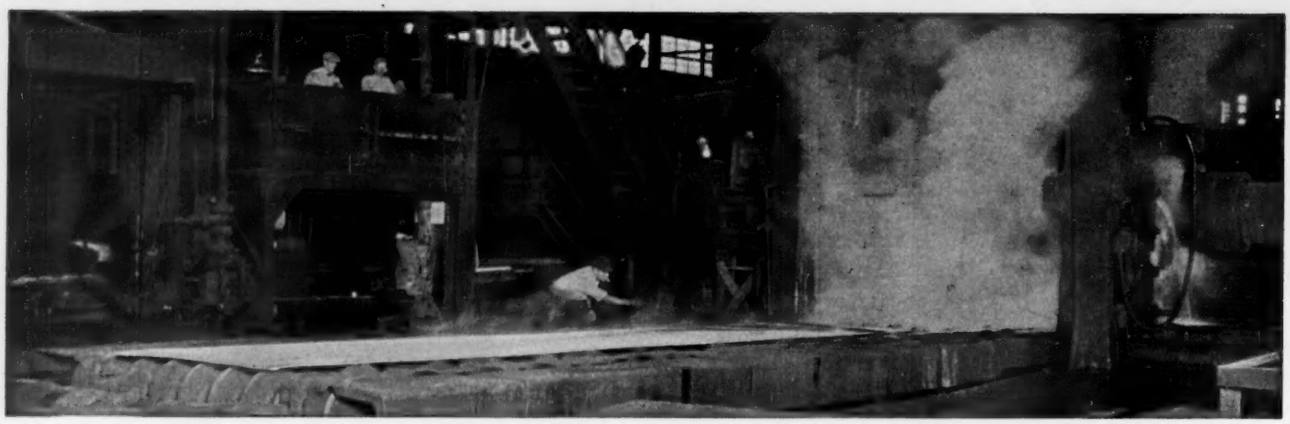
(*Please turn to Page* 43)

Table VI

Cold Rolling Test on Cold Rolling Mill B.*

Pass. No.	Thickness Initial	Thickness Final	Reduction	Length of contact	Lever Arm of separating Force	Separating Force	Rolling Torque	Roll Speed	Rolling Power	Motor Power	Power Loss Absolute	Power Loss Relative
	inch (1)	inch (2)	per cent (3)	inch (4)	inch (5)	lbs. (6)	ft. lbs. (7)	r.p.m. (8)	kilowatts (9)	kilowatts (10)	kilowatts (11)	per cent (12)
Test Series I—Width of Strips 5.32 Inches.												
1	0.0355	0.0268	24.5	0.1405	0.0614	62,900	1164	38	6.3	13.5–21.5	7.2–15.2	53–71
2	0.0268	0.0197	26.5	0.1271	0.0543	83,800	1374	38	7.4	16.0–21.5	8.6–14.1	54–66
3	0.0197	0.0152	23.0	0.1016	0.0445	84,900	1143	38	6.2	12.5–24.5	6.3–18.3	50–75
4	0.0152	0.0118	22.0	0.0874	0.0386	95,900	1114	38	6.0	16.0–31.0	10.0–25.0	62–81
Test Series II—Width of Strips 3.55 Inches.												
1	0.0370	0.0244	34.0	0.1696	0.0689	58,000	1208	38	6.5	12.5	6.0	48
2	0.0244	0.0157	35.5	0.1405	0.0563	72,800	1236	38	6.6	13.0–18.5	6.4–11.9	49–64
3	0.0157	0.0106	32.5	0.1079	0.0441	86,000	1143	38	6.2	12.5–20.0	6.3–13.8	50–69
4	0.0106	0.0083	22.2	0.0732	0.0323	83,800	817	38	4.4	8.5–11.5	4.1– 7.1	48–62
5	0.0083	0.0067	19.0	0.0599	0.0268	87,100	709	38	3.8	7.5– 8.0	3.7– 4.2	49–53
Test Series III—Width of Strips 2.36 Inches.												
1	0.0394	0.0177	55.0	0.2225	0.0748	57,300	1301	38	7.0	12.8	5.8	45
2	0.0177	0.0102	42.2	0.1307	0.0500	76,100	1143	38	6.2	10.0–11.5	3.8– 5.3	38–46
3	0.0102	0.0075	26.9	0.0791	0.0339	75,000	767	38	4.1	6.5	2.4	37
Test Series IV—Width of Strips 2.36 Inches.												
1	0.0783	0.0413	47.2	0.2907	0.1051	62,200	1982	38	10.7	18.5	7.8	42
2	0.0413	0.0248	40.0	0.1945	0.0748	87,500	1982	38	10.7	17.0	6.3	37
3	0.0248	0.0165	33.3	0.1374	0.0559	90,400	1533	38	8.3	11.5	3.2	28
4	0.0165	0.0110	33.3	0.1122	0.0457	84,900	1171	38	6.3	9.5–11.5	3.2– 5.2	34–45

*Roll diameter = 8.23/3.15 inches.



PROGRESS IN STEELMAKING

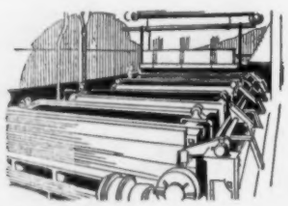
USE of salt has been found helpful to hot sheet mill crews at an Ohio mill. Under normal conditions a man sweats about 30 grains of salt an hour when performing various duties involved in the hot rolling of sheets, and should take enough salt back into his system to compensate for this loss. Salt is a fine preventive of cramps and heat exhaustion but will not do much good if heavy foods are eaten during the turn.

♦ ♦ ♦

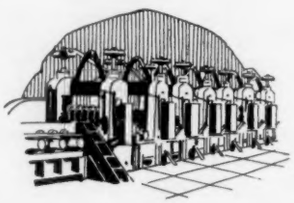
Uniform temperature secured in annealing furnaces of the bell type has obviated the necessity of reannealing strip, inasmuch as neither hard nor sticking coils arise.

♦ ♦ ♦

Development of a new system for controlling two or more fuels using a single unit for regulating the combustion air, and with selective control of the various fuels, has been announced. This system now is employed in the operation of two steel mill boilers and four open-hearth furnaces at an Eastern plant. Significance of the development is that for the first time the air requirements, or B.t.u. value, is totalized with the single regulator.



CLAY tile asphalt impregnated to a depth of 2 inches has been developed for pickling tanks. The tile, 12 x 12 x 1 inch are treated with a specially prepared asphalt with a high melting point. When the slabs are assembled in a tank, the joints are made of the same asphalt material. The impregnated refractory has been immersed in 50 per cent and 75 per cent volume sulphuric acid for months without change; and has been boiled in 10 per cent sulphuric acid for many hours without any defect being detected. It is claimed that no harm will be done if the surface is abraded because the impregnated tile will resist the action of the hot acid.



DIFFICULTY with roll neck bearing lubricant, which congeals in the pipe lines during the winter months, now can be avoided. At one plant where this trouble was encountered, a steam pipe or air duct was nested with the pipe lines; now soil-heating cable has been wound around the pipes and insulation applied. An automatic adjustable thermostat maintains the temperature of the lubricant at the proper degree, irrespective of the weather conditions.

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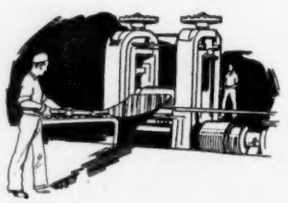
Steel warehouse practice in England frequently involves the use of the spectroscope for finding bars of different quality in a batch which ostensibly is all of the same grade. Bars and rods 3 to 12 feet long are run along three rails and come to rest on three concave rollers. At this point the operator drags the bar along the concave rollers toward the instrument, known as the steeloscope. An upright rod of pure iron then is brought in contact with the bar being tested and an arc is formed by the two specimens. The instrument discloses whether all the bars in the batch have the same content of, for example, nickel. Numerous metals can be sought at the same time—chromium, molybdenum, copper, cobalt, tungsten, vanadium, manganese and titanium all can be handled. In normal working samples of steel are examined at the rate of about one a minute where two elements, such as nickel and chromium, are in question; and, about one in two minutes where a third element, such as molybdenum, also is involved. Any steels not legitimately belonging to a batch can be determined rapidly and with certainty.

♦ ♦ ♦

Preventing the formation of rust on full-finished sheets in the warehouse is accomplished at a western sheet mill by an air conditioning system consisting of warm air furnaces which operate automatically to supply heat whenever the combination of temperature and humidity approaches the dew point. The automatic humidity control admits gas to the burners when the relative humidity in the space served reaches a point preset on the control instrument.



DEEP drawing tin plate with the desired normalized grain structure now can be produced by employing a controlled-atmosphere, electric-normalizing furnace. The white pickling operation, to which conventional normalized stock must be subjected, is unnecessary, thus effecting a saving of approximately $1.20 a ton.

SCANNING THE FIELD OF TECHNOLOGY

A Digest of Important Developments Pertaining to the Production, Processing, Application and Performance of Steel

Electricity and Steel

Electrical Production, January, p. 2, 2½ pp., 3 ills.

Part which electricity plays in the production of black plate and tin mill black plate in the plant of the W. H. Davey Steel Co., Cleveland. Steel is received in form of bar stock, is sheared, heated in pair furnaces, rolled on hot mills, sheared and opened, pickled, annealed, cold rolled and shipped. Driven rolls of seven hot mills are on a common shaft, motivated by a 1200-horsepower reversing motor. Two cold mills are driven by a 150-horsepower motor through a common shaft. Sixteen electrically driven shearing machines are operated.

—STEEL, 1-8-34

Iron-Carbon Oxides

By H. C. Vacher, in research paper RP606 of the bureau of standards, 12 pp., 3 ills., 6 tables.

Study of the system liquid iron-carbon oxides. The value 0.0025, previously obtained for the product of the carbon and oxygen contents of liquid iron under specified conditions, is confirmed. Method of approaching equilibrium consisted of passing a known mixture of carbon oxides at one atmosphere pressure over liquid iron maintained at 1580 degrees Cent. After approximately 90 minutes the liquid iron was allowed to freeze in the crucible and the ingot was analyzed for carbon and oxygen. Equilibrium was approached from both directions by adjusting the composition of the charges.

—STEEL, 1-8-34

Furnace Control

By H. J. Velten, in a paper presented at the annual meeting of the American Society of Mechanical Engineers in New York, Dec. 5-8.

Consideration of the various aspects of automatic control for metallurgical furnaces. Open-hearth and reheating furnaces are the two general types studied.

—STEEL, 1-8-34

Critical Temperatures

By Lieut. Col. R. R. Abbott, metallurgical engineer of the White Motor Co., Cleveland, in a paper presented before the Cleveland chapter of the American Society for Steel Treating, 24 pp., 5 diags., 6 tables.

This paper represents a small part of the results of extensive experimental research upon the effect of various elements on the physical properties of steels; more specifically, a mathematical determination of the effect of various elements upon the upper critical temperature or Ac_3 point of steel. Study was made of some 400 bars of steel produced in various countries. Mathematical determinations involved use of the method of least squares.

—STEEL, 1-8-34

Pumping Machinery

Paper by A. Peterson, chief engineer, pump department, DeLaval Steam Turbine Co., Trenton, N. J., reprinted by the company, 8 pp., 5 ills., 4 charts.

Outline of economic developments which have taken place with respect to waterworks pumping machinery during the past 20 years. Centrifugal pumps, now largely used in waterworks pumping, have experienced only minor changes as to materials and construction but efficiencies have been improved greatly. It is indicated that many pumping installations now in service can be scrapped to effect sizable annual savings, at the same time creating employment.

—STEEL, 1-8-34

Martensite

By O. W. McMullan, in a paper presented at the National Metal congress in Detroit, Oct. 2-6, published in Transactions of the American Society for Steel Treating, November, p. 1035, 24 pp., 26 ills., 3 tables.

Describing the occurrence of grains of martensite or martensite and austenite in air-cooled low-carbon steels of fairly low alloy content. Their effect on cutter life and quality of finish on machined parts is discussed. A heating and cooling cycle is described which will eliminate both the martensite and banding which occur during treatments usually given.

—STEEL, 1-8-34

Cast Iron

Symposium held at June meeting of the American Foundrymen's association, Chicago, third in a series sponsored by this organization and the American Society for Testing Materials, Philadelphia; 164 pp., illustrated, available for $1 per copy from either society.

This symposium on cast iron, in its published form is a compilation, correlation and critical interpretation by experts of information and data on the production and use of this material. Its method of preparation—by an advisory committee appointed by the above two societies—insures a composite viewpoint and authoritativeness. Subjects covered include metallurgy, involving alloy cast iron; properties (physical constants, mechanical properties); classification and specifications; heat treatment, white and chilled irons; welding; and foundry factors of importance in production.

—STEEL, 1-8-34

Refractories

By A. C. Hughes, in technical bulletin No. 44 of the American Refractories institute, November, 8 pp., 2 ills., 1 table, flow sheet.

An outline of the manufacture and properties of power-pressed brick. The power-press or dry-press method of forming refractory shapes involves a totally different procedure from the old hand-made method, and in recent years has been gaining popularity. Properties of typical dry-pressed brick are tabulated.

—STEEL, 1-8-34

Chromium Plate

By Marvin J. Udy, in Metal Progress, December, p. 24, 4½ pp., 3 ills., 1 table.

Summary of properties of chromium, presented in the effort to answer questions regarding the correct use of chromium plating. Proper selection of base metal, proper design and adequate refinishing are essential for wear resistance of chromium plated parts. In decorative work, corrosion resistance is obtained by copper and nickel undercoats, and chromium serves primarily to resist tarnish.

—STEEL, 1-8-34

Die Design

By J. C. Oliver, in The Australasian Engineer (Australia), Nov. 7, p. 12, 2 pp., 10 ills.

Some principles of die design and application are discussed, with particular reference to blanking dies; compound blanking, piercing, drawing and trimming dies; follow, progressive or stage dies; cupping dies; bending and forming dies; and drawing dies. Lack of quantity production demands in Australia imposes cost limitations upon die designers, not experienced in the United States.

—STEEL, 1-8-34

Making the Most of

METHODS AND MATERIALS

CONTINUOUS increase in depth of coal mine shafts in France is causing engineers to look for appropriate means to reduce weights and dimensions of equipment. For mine cages, possibilities are particularly interesting. For instance, a double-decked cage of four cars, made of soft steel and weighing 2591 pounds, was replaced with one made of semihard alloy steel of the following approximate composition: Carbon 0.35, nickel 2.6, chromium 0.6-0.8, and molybdenum 0.5 per cent; with double the ultimate tensile strength and elastic limit of the carbon steel. No modification was made in the form of construction, and the safety factors were higher than those of the cage displaced. With this cage, it was possible to reduce the weight to 1773 pounds, a reduction of 818 pounds, or 31.5 per cent. In another case, a four-decked cage of two cars, weighing 2273 pounds built of soft steel, was replaced with one of alloy steel of the above composition, and a weight reduction of 857 pounds, or 37.7 per cent, was obtained. Although first cost of the cages was increased, the lighter construction effected a reduction in the section and weight of the wire rope, which is more important the greater the hoisting depth.

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A PROMINENT foundry in the Middle West now is engaged in the production of a new type of automotive brake drum in which the hub or vertical member is a steel plate while the drum or ring on which the brake operates is gray cast iron. The steel plate is placed in the bottom of an ordinary green sand mold. Exceedingly hot iron entering through numerous gates comes into contact with a raised edge or rim on the perimeter of the steel plate. In the finished casting the iron and steel are held in intimate contact by fusion, by natural contraction and by key slots spaced a few inches apart all around the rim of the steel plate.

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Incorporation of molybdenum with a high-chrome high-nickel steel, such as 18-8 austenitic, does not materially increase creep at temperatures up to 1100 degrees Fahr., but is made use of extensively for assisting its power to combat acid corrosion—especially by sulphuric, hydrochloric, sulphurous and phosphoric acids. In such steel there is reason to believe that the incorporation of considerable amounts of molybdenum should increase its creep resistance at higher temperatures.

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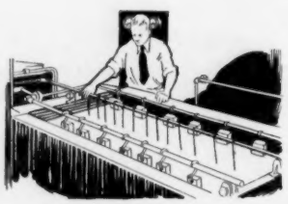
For several years attempts have been made to chromium plate successfully the common working barrels of oil wells. Test results in these cases were dependent entirely upon the type of plating job obtained. If the plating was free from pinholes, an extension in service over a nonplated barrel usually was obtained. In the majority of cases,



however, the coating peeled or became worn from the barrel walls because of faulty application. This resulted in an unsatisfactory life for both the barrel and the cups used in it. Recently, chromium-plated tubes for insert-type pumps have been obtained which have shown a high degree of resistance to these faults. The high cost of these plated barrels make it inadvisable to use them under all conditions, but under severe conditions of corrosion, or with excessive sand in the fluid, they may be used to advantage.

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Nickel has a definite place in cast iron; while this element itself in moderate proportions does not directly raise the tensile strength of an iron to any appreciable extent, it nevertheless promotes machinability in irons that otherwise might be too hard at greatly reduced changes of section. This is due partly to its direct graphitizing effect; its presence in small quantities therefore renders it possible to use a strong base iron which otherwise would be inherently too hard a plain iron for successful use.

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IN THE hard service of industry, a corrosive or high temperature condition must be present to warrant the installation of higher-priced 18-8 stainless steel wire rope in place of ordinary rope. Ropes wear out or are destroyed because of one or more of the following causes: Abrasion, fatigue, corrosion and high temperature. If the abrasive or fatigue condition is the primary cause of rope replacement, it is evident that a stainless steel wire rope would not be justified, because it would also be destroyed by these same causes and its really important qualities of corrosion and high temperature resistance would be of secondary consideration.

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It is believed that galvanized wrought-iron sucker rods used in the oil industry will give very excellent service in those fields in which actual pitting of the rods from the corrosive conditions presents a serious problem. Galvanized steel sucker rods have been tested in such fields, and have been very unsatisfactory due to the fact that the zinc flakes off the rods; but it is felt that galvanized wrought-iron sucker rods would not be subject to this difficulty.

$ $ $

Installations have been made recently in which cast high-chromium steel muffles are used successfully in gas-carbonizing furnaces. Austenitic chrome-nickel steel castings were first tried in this application by reason of their inherent toughness, but the gases cracked to such an extent that carbonization almost entirely ceased. Application in the form of glass molds and plungers has indicated a decided advantage in favor of the higher plain chromium steels.

Steel Demands Combining for Early Bulge

Heavy Automotive, Railroad and Public Works Tonnage Being Deferred for February-March Production—Miscellaneous Requirements Support Steel Rate

STEEL production appears to be heading toward a pronounced February-March bulge as requirements from the railroads, automotive and building industries are deferred, steel executives envisioning at least a 60 per cent rate as a possibility in this quarter.

Still handicapped by production difficulties for new models, due primarily to adoption of front-spring suspensions, steel orders from automobile builders expected early in January are postponed at least several weeks. Chevrolet and Ford probably will break the log jam shortly, and other manufacturers will be in the market with sufficient tonnage to make February an exceptionally strong month for steel shipments.

In February and March mills will begin to roll rails resulting from the government's financing, and car repair and building programs by that time should be translated into larger steel demands. Public construction work held in abeyance during the winter is expected to expand under seasonal influences and the clearly defined purpose of the Washington administration to push ahead with federal-aid projects.

Meanwhile, miscellaneous requirements from a diversified list of consumers, plus some moderate automotive, railroad and structural business, have been sufficiently broad to prevent steelworks operations last week going below 31 per cent, exactly twice the rate in the comparable week last January. All indications appear to assure a rebound of several points this week.

Steel Rate Rises in Four Districts; Consumers' Stocks Now Being Absorbed

Operations actually increased in the Wheeling, New England, Cleveland and Detroit districts, the latter rising 27 points to 79 per cent as the Great Lakes division of the National Steel Corp. reached 100 per cent, partly for stock production. New England rose 23 points to 95 per cent; Wheeling 15 to 56; and Cleveland 6 to 51. Chicago was off 6 points to 34; Youngstown 6 to 32; Pittsburgh 5 to 22, and eastern Pennsylvania 2 to 22½; while Birmingham held at 52. Tin plate production after several months close to capacity is down 30 more points to 45 per cent.

January was anticipated as a month of assimilation of stocks in consumers' hands, but miscellaneous steel orders during the first week proved unexpectedly heavy, overcoming much of the lag in the major classifications. With inventories now out of the way, the general manufacturing trade is beginning to negotiate first quarter contracts. The new year starts, therefore, with steelmakers highly encouraged by the outlook.

Structural shape awards for the week, 14,961 tons, held fairly close to last year's average. Noted on the Pacific Coast is the fact shape awards there last year were the highest in history, even exceeding the former peak in 1929 by 69,000 tons. Active for early award in that district are 95,000 tons. The navy has placed 6168 tons of plates and 3000 tons of shapes for various yards.

PWA approval of a $77,000,000 loan to the Pennsylvania railroad is expected to release shortly a heavy tonnage of structural material for completion of its electrification program, construction of 7000 freight cars, and orders for 100 locomotives. Of shapes originally awarded for electrification, 40,000 tons remain to be specified.

New York Central To Buy 40,000 Tons of Rails; Scrap Prices Again Advance

New York Central is formulating an inquiry for 40,000 tons of rails, its officially estimated rail requirements for 1934. Chicago, Milwaukee, St. Paul & Pacific is to purchase 75 coaches; Norfolk & Western, 18, while Chesapeake & Ohio is inquiring for 26, and Nickel Plate, eight. Actual freight car orders last month, 316, brought the total for the year to 2460, compared with 1739 in 1932; and 10,694 in 1931.

Raw materials are strong, with scrap prices continuing to advance. Farm implement manufacturers are taking more pig iron, but shipments in general this month are expected to be about half the December tonnage, as a reaction from the heavy movement last month.

Daily average pig iron production in December was 38,456 gross tons, 6.4 per cent higher than November. The total for the month, 1,192,136 tons, brought the output for the year to 13,221,707 tons, 52.3 per cent over 1932. At the year's close 74 stacks were active, three less than Nov. 30.

STEEL's iron and steel composite is unchanged at $32.42; the finished steel composite remains $51.10; while the scrap index is up 17 cents to $10.87.

COMPOSITE MARKET AVERAGES

	Jan. 6	Dec. 30	One Month Ago Dec., 1933	Three Months Ago Oct., 1933	One Year Ago Jan., 1933	Ten Years Ago Jan., 1924
Iron and Steel Composite	$32.42	$32.42	$32.42	$31.59	$28.68	$43.26
Finished Steel Composite	51.10	51.10	51.10	49.20	46.13	67.71
Steelworks Scrap Composite	10.87	10.70	10.12	10.37	6.23	18.23

Iron and Steel Composite:—Pig iron, billets, slabs, sheet bars, wire rods, tin plate, nails, sheets, plates, shapes, bars, and black pipe. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

	Jan. 6, 1934	Dec. 1933	Oct. 1933	Jan. 1933
Finished Material				
Steel bars, Pittsburgh	1.75	1.75	1.75	1.60
Steel bars, Chicago	1.80	1.80	1.80	1.70
Steel bars, Philadelphia	2.04	2.04	2.04	1.91
Iron bars, Terre Haute, Ind.	1.60	1.60	1.60	1.65
Shapes, Pittsburgh	1.70	1.70	1.70	1.60
Shapes, Philadelphia	1.90	1.90½	1.90½	1.70
Shapes, Chicago	1.75	1.75	1.75	1.70
Tank plates, Pittsburgh	1.70	1.70	1.70	1.60
Tank plates, Philadelphia	1.88	1.88½	1.88½	1.66
Tank plates, Chicago	1.75	1.75	1.75	1.70
Sheets, No. 10, hot rolled, Pitts.	1.75	1.75	1.75	1.65
Sheets, No. 24, hot ann., Pitts.	2.25	2.25	2.25	2.05
Sheets, No. 24, galvan., Pitts.	2.85	2.85	2.85	2.70
Sheets, No. 10, blue anneal., Gary	1.85	1.85	1.85	1.85
Sheets, No. 24, hot anneal., Gary	2.35	2.35	2.35	2.25
Sheets, No. 24, galvan., Gary	2.95	2.95	2.95	2.85
Plain wire, Pittsburgh	2.20	2.20	2.10	2.15
Tin plate, per base box, Pitts.	5.25	5.25	4.65	4.25
Wire nails Pittsburgh	2.35	2.35	2.10	1.90
Semifinished Material				
Sheet bars, open-hearth, Youngs.	26.00	26.00	26.00	26.00
Sheet bars, open-hearth, Pitts.	26.00	26.00	26.00	26.00
Billets, open-hearth, Pittsburgh	26.00	26.00	26.00	26.00
Wire rods, Pittsburgh	36.00	36.00	35.00	36.20

	Jan. 6, 1934	Dec. 1933	Oct. 1933	Jan. 1933
Pig Iron				
Bessemer, del. Pittsburgh	19.26	19.26	19.26	15.76
Basic, valley	17.00	17.00	17.00	14.00
Basic, eastern, del. eastern Pa.	18.76	18.76	17.76	13.50
No. 2 foundry, del. Pittsburgh	18.76	18.76	18.76	15.76
No. 2 foundry, Chicago	17.50	17.50	17.50	15.50
Southern No. 2, Birmingham	13.50	13.50	13.50	11.00
No. 2X, Eastern, del. Phila.	19.63	19.63	18.63	13.76
Malleable, valley	17.50	17.50	17.50	14.50
Malleable, Chicago	17.50	17.50	17.50	15.50
Lake Superior charcoal, del. Chi.	23.54	23.54	23.54	23.04
Gray forge, del. Pittsburgh	18.38	18.38	18.38	15.63
Ferromanganese, del. Pittsburgh	90.24	87.24	87.24	73.24
Scrap				
Heavy melting steel, Pittsburgh	$12.75	12.20	12.45	8.35
Heavy melting steel, eastern Pa.	11.50	10.25	10.19	6.50
Heavy melting steel, Chicago	10.25	9.00	9.35	5.25
No. 1 wrought, eastern Pa.	12.50	11.00	10.75	6.50
No. 1 wrought, Chicago	9.25	8.45	9.10	5.00
Rails for rolling, Chicago	10.75	10.35	11.10	8.05
Coke				
Connellsville, furnace, ovens	3.75	3.75	3.25	1.75
Connellsville, foundry, ovens	4.25	4.25	3.85	2.50

Steel, Iron, Raw Material and Metals Prices

Prices conform to American Iron and Steel institute schedules. Asterisks denote price changes this week

Sheet Steel

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.75c
Gary, base	1.85c
Chicago, del.	1.88c
New York, del.	2.08c
Philadelphia, del.	2.04c
Birmingham, base	1.90c
St. Louis, del.	2.07c
F.o.b. cars, dock Pacific ports	2.42½c

HOT ROLLED ANN. No. 24

Pittsburgh, base	2.25c
Gary, base	2.35c
Chicago, del.	2.38c
Detroit, del.	2.45c
New York, del.	2.58c
Philadelphia, del.	2.54c
Birmingham, base	2.40c
St. Louis, del	2.57c
F.o.b. cars, dock, Pacific ports	2.95c

GALVANIZED No. 24

Pittsburgh, base	2.85c
Gary, base	2.95c
Chicago, del.	2.98c
Philadelphia, del.	3.14c
New York, del.	3.18c
Birmingham, base	3.00c
St. Louis, del	3.17c
San Francisco, f.o.b. cars, dock	3.55c

TIN MILL BLACK No. 28

Pittsburgh, base	2.65c
Gary, base	2.75c
St. Louis, del.	2.97c

COLD ROLLED No. 10

Pittsburgh, base	2.30c
Detroit, delivered	2.50c
Gary, base	2.40c
Philadelphia, del.	2.59c
New York, del.	2.63c

COLD ROLLED No. 20

Pittsburgh, base	2.75c
Detroit, base	2.95c
Gary, base	2.85c
Philadelphia, del.	3.04c
New York, del.	3.08c

ENAMELING SHEETS

Pittsburgh, No. 10	2.45c
Pittsburgh, No. 20	2.90c

Tin and Terne Plate

Per 100-lb. box, Pittsburgh. Gary base, 10 cents higher

Tin plate, coke base, contract	$5.25
Do., stock	4.55
Long ternes, No. 24 unassorted	3.25c

Corrosion and Heat Resistant Alloys

Base, Pittsburgh

18% chrome, 8% nickel; sheets, 35c; plates, 28c; bars, 24c; hot-rolled strip, 24.50c; cold-rolled strip, 32.00c.

	A	B	C	D
Bars	17c	18.5c	21c	26c
Plates	20c	21.5c	24c	29c
Sheets	25c	28c	31c	35c
Hot strip	17c	18.5c	21c	26c
Cold strip	22.5c	24c	27c	35c

Carbon 0.12 and under; no nickel. A has chrome 15% and under. B over 15/18% inc., C over 19/23% inc., D over 23/30%.

Steel Plates

Pittsburgh, base	1.70c
New York, del.	1.98c
Philadelphia, del	1.88½c
Boston, del.	2.10c
Buffalo, del	1.93½c
Chicago, base	1.75c
Cleveland, del.	1.88½c
Birmingham, base	1.85c
Coatesville, base	1.80c
Sparrow's Pt., base	1.80c
Pacific Coast, f.o.b. cars, dock	2.25c
St. Louis, del	1.97c

Structural Shapes

Pittsburgh, base	1.70c
Philadelphia, del.	1.90½c
New York, del.	1.95½c
Boston, del.	2.08½c
Bethlehem, base	1.80c
Chicago, base	1.75c
Cleveland, del.	1.88½c
Buffalo, base	1.80c
Birmingham, base	1.85c
Pacific Coast, f.o.b. cars, dock	2.25c

Bars

SOFT STEEL

Pittsburgh, base	1.75c
Chicago, base	1.80c
Birmingham, base	1.90c
Buffalo, base	1.85c
Cleveland, base	1.80c
Detroit, del.	1.90c
Pacific Coast ports, cars, dock, c.i.f.	2.30c
Philadelphia, del.	2.04c
Boston, del.	2.19c
New York, del.	2.08c
Pitts., forg. qual.	1.75c-2.25c

RAIL STEEL
To Manufacturing Trade

Pittsburgh	1.65c
Chicago	1.70c
Cleveland	1.70c
Gary, Ind.	1.70c
Buffalo	1.75c

IRON

Terre Haute, Ind. base	1.60c
Philadelphia, base	1.74c
Pittsburgh, refined	2.75c-7.50c

REINFORCING
New billet, cut lengths, carlots

Pittsburgh	1.90c
Chicago, Gary, Buffalo, Cleve., Birm., Young	1.95c
Gulf ports	2.30c
Pacific coast ports	2.45c
Philadelphia, del.	2.19c

Rail steel

Pittsburgh, base	1.75c
Chicago, Buffalo, Cleveland, Birm., Young.	1.80c
Gulf ports	2.15c
Pacific coast ports	2.30c

Wire Products □ □

(Prices apply to straight or mixed carloads; pool cars, or less, 10c up. 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base, Pittsburgh-Cleveland
(Per 100-lb. keg)

Standard wire nails	$2.35
Cement coated nails	2.35
Galvanized nails, 15 gage and coarser	4.35c
Do., 16 gage and finer	4.85c

(Per pound)

Polished staples	3.05c
Galvanized fence staples	3.30c
Barbed wire, galv.	2.85c
Annealed fence wire	2.35c
Galvanized fence wire	2.70c
Woven wire fencing (base column, c.l.)	$60.00
Plain wire, 6-9 gage to mfg trade	2.20c

Anderson, Ind., Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire	3.20c

Chicago and Waukegan $1 higher, Worcester $2 higher.

Cold-Finished Carbon Bars

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.	2.10c
20,000 to 59,999 lbs.	2.05c
60,000 to 99,999 lbs.	2.00c
100,000 lbs. and over	1.97½c

Chicago, Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Shafting □ □ □

Turned and ground, Pitts. base	
1⅛-inch	3.40c
1 3/16 to 1½-inch	2.90c
1 9/16 to 1⅞-inch	2.75c
1 13/16 to 2⅞-inch	2.60c
2 13/16 to 6-inch	2.45c

Alloy Steel Bars □

Hot rolled

Pittsburgh, Buffalo, Chicago, Massillon, Canton 2.45c
Bethlehem 2.55c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 .15 to .25 Mo. 0.50
4600 .20 to .30 Mo. 1.25-1.75 Ni. 1.05
5100 .80-1.10 Cr. 0.45
5100 Cr. spring base
6100 bars 1.20
6100 spring 0.70
Cr., Ni., Van. 1.50
Carbon van 0.95
9250 carbon base plus extras

Strip and Hoops □

Hot strip to 23½-in.

Pittsburgh	1.75c
Do., Chicago	1.85c
Do., del. Detroit	1.95c
Do., del. Phila.	2.04c
Do., del. N. Y.	2.08c
Cooperage hoop, Pittsburgh	1.85c
Do., Chicago	1.95c
Cold-rolled strip, Pitts., Cleve.	2.40c
Worcester	2.60c

Rails, Track Material □

(Gross Ton)

Standard rails, mill	$36.37½
Relay rails, Pitts. 20-45 lbs.	$26.00
50-60 lbs.	$23.00
70-75 lbs.	$18.00
80-85 lbs.	$24.00
100 lbs.	$25.00
Light rails, billet qual., Pitts., Chi.	$32.00
Do., reroll. qual.	$31.00
Angle bars, mills	2.55c
Spikes, R. R., base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs., up $2; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons or more; diff. for less.

Bolts and Nuts □ □

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots. Dec. 1, 1932, lists.

CARRIAGE BOLTS

All sizes, cut thread	70 off
Rolled thread, ½ x 6 and smaller	70 off

MACHINE BOLTS

All sizes. cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts	70 off
Tire bolts	60 off
Stove bolts, 70-25-10 off in pkgs.; 83 off in bulk, 5000 or more of a size.	
Rolled thread machine bolts, ½ x 6 and smaller	70 off
Step bolts	66 off
Elevator bolts	66 off

NUTS

Semifinished	70 off

HEXAGON CAP SCREWS

Milled	80-10-10 off
Upset 1-in., smaller	85 off

SQUARE HEAD SET SCREWS

Upset, 1-in., smaller	75-10 off
Upset, larger than 1-in.	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c.l., Pittsburgh, Cleveland	2.75c
Struc., c.l., Chicago	2.85c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 10 off
Wrought washers, Pitts., Chi., Phila.	6.00-6.25 off

Cut Nails, Piling □

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more; no discount on size extras	$3.00
Do., less than 5 kegs; no discount on size extras	$3.15
Steel piling, Pittsburgh	2.00c
Steel piling, Chi., Buff.	2.10c

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

Steel

In.	Blk.	Gal.
¼ and ⅜	57	38½
½	62	50½
¾	65½	55½
1—3	67½	58½

Iron

½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

LAP WELD

Steel

2	63½	54½
2½—3	66½	57½
3½—6	68½	59½
7 and 8	67½	57½
9 and 10	67	57

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½
9—12	38	24½

LINE PIPE

Steel

⅛-inch, butt weld	50½
¼—⅜, butt weld	56
½, butt weld	61
¾, butt weld	64½
1—3, butt weld	66½
2-inch, lap weld	62½
2½—3, lap weld	65½
3½—6, lap weld	67½
7—8, lap weld	66½

Iron

1⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe list. 8—12 inch no extra.

BOILER TUBES

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3¾	50	3	17
4	52	3¾—3½	18
4½—6	42	4	20
1½	1	4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% discounts on steel and 10% on charcoal iron.

Lapwelded steel: Under 10,000 lbs., 6 pts. under base and one 5%; on 10,000 lbs. to carload, 4 pts, under base and two 5%. Quantity discounts same as for hot-rolled. Charcoal iron: Under 10,000 lbs., 2 pts. under base; on 10,000 lbs. to carload, base and one 5%.

SEAMLESS BOILER TUBES

Cold Drawn

2—2¼	27	3¼—3½	41
2½—2¾	34	4	46
3	38	4½, 5, 6	43

(On 1—1¾-inch sizes mechanical tubing dis. apply.)

Hot Rolled

2—2¼	33	3¼—3½	47
2½—2¾	40	4	49
3	44	4½, 5, 6	42

Quantity discounts: Under 10,000 lbs., 10 pts. and 5%; 10,000 to 24,999 lbs., 6 pts. and 5%; 25,000 lbs. to carload, 2 pts. and 5 and 5%; carload and over, base discount and 5 and 5%. No extra for lengths 24 ft. and under.

Seamless Tubing □

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe □

Class B. Pipe—Per Net Ton

6-in & over, Birm.	$36.00-37.00
4-in., Birm.	39.00-40.00
4-in., Chicago	47.00-48.00
6 to 24 in., Chicago	44.00-45.00
6-in. & over, east. fdy.	40.00
Do., 4-in.	43.00

Class A pipe $3 over Class B. Stnd, fitgs., Birm. base $90.00

Six to 24-inch, fittings, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, 5 higher.

Semifinished Steel □

Prices Per Gross Ton

BILLETS AND BLOOMS
4 x 4 inch base

Pitts., Chi., Cleve., open-hth. & bess.	$26.00
Philadelphia	31.30
Forging, Pitts., Chi.	31.00

SHEET BARS

Pitts., Cleve., Yong.	26.00
Chicago	26.00
Canton, O.	26.00

SLABS

Pitts., Cleve., Yong.	26.00

WIRE RODS

Pitts., Cleveland	36.00
Chicago	36.00

SKELP

All grades, Pitts. and Chicago	1.60c

Coke □ □ □

Price Per Net Ton

BEEHIVE OVENS

Connellsville fur.	$3.75
Connelsville fdry.	4.25
Connel. prem. fdry.	5.00- 5.25
New River fdry.	6.00
Wise county fdry.	4.25- 5.00
Wise county fur.	3.50- 4.25

BY-PRODUCT FOUNDRY

Newark, N. J., del.	8.71- 9.31
Chi. ov., outside del.	8.50
Chicago, del.	9.25
New England, del.	10.50
St. Louis, del.	9.25
Birmingham, ovens	5.00
Indianapolis, del.	8.75
Ashland, Ky., Connellsville basis	6.00
Portsmouth, ovens, Connellsville basis	6.00
Buffalo, ovens	7.50- 8.00
Detroit, ovens	8.00
Philadelphia, del.	9.00

Coke By-Products □

Per gallon, producers' plants.

Tank lots	Spot
Pure benzol	$0.22
90 per cent benzol	0.22
Toluol	0.30
Solvent naphtha	0.26
Commercial xylol	0.26

Per lb. f.o.b. New York

Phenol (200 lb. drums)	0.163c
Do., (100 lb.)	0.173c

Per lb., producers' plants

Naphthalene flakes and balls	6.00- 7.25
Per 100 lb. Atlantic seaboard	
Sulphate of ammonia	$1.25

Pig Iron

Delivered prices do not include switching charges except as noted. No 2 foundry iron is 1.75-2.25 silicon; 25-cent differentials apply for each 0.25 silicon above 2.25

Gross Tons

	No. 2 Fdry.	Malleable	Basic	Bessemer
Basing Points:				
Bethlehem, Pa.	$18.50	$19.00	$18.00	$19.50
Birdsboro, Pa.	18.50	19.00	18.00	19.50
Swedeland, Pa.	18.50	19.00	18.00	19.50
Sparrows Point, Md.	18.50	.....	18.00	.....
From Swedeland, Pa., del. to Phila.	19.26	19.76	18.76	.....
From Bethlehem, del. to Brooklyn	20.77	21.27	.....	.....
From Bethlehem, del. to Newark, N. J.	19.99	20.39	.....	.....
Basing Point:				
Everett, Mass.	18.50	19.00	18.00	19.50
From Everett, del. to Boston	19.00	19.50	18.50	20.00
Basing Point:				
Buffalo	17.50	18.00	16.50	18.50
From Buffalo, del. to Boston	19.00	19.50	18.50	20.00
Basing Points:				
Neville Island, Pa.	18.00	18.00	17.50	18.50
Sharpsville, Pa.	17.50	17.50	17.00	18.00
Youngstown, O.	17.50	17.50	17.00	18.00
From Neville Island, Pa., del. to Pittsburgh district	(Neville Island base, plus 63c to $1.13 switching charges)			
Basing Points:				
Erie, Pa.	17.50	18.00	17.00	18.50
Cleveland	17.50	17.50	17.00	18.00
Toledo, O.	17.50	17.50	17.00	18.00
Detroit	17.50	17.50	17.00	18.00
From Detroit, del. to Saginaw, Mich.	19.60	19.60	19.10	20.10
From Cleveland, del. to Akron, Canton, O.	18.76	18.76	18.26	19.26
From Toledo, del. to Mansfield, O.	19.26	19.26	18.76	19.76
Basing Point:				
Hamilton, O.	17.50	17.50	17.00	18.00
From Hamilton, del. to Cincinnati	18.51	18.51	18.01	19.01
Do., del. to Indianapolis	19.77	19.77	19.27	20.27
Basing Points:				
Duluth	18.00	18.00	.....	18.50
Chicago	17.50	17.50	17.00	18.00
Granite City, Ill.	17.50	18.00	17.00	.....
From Duluth, del. to St. Paul	19.94	19.94	.....	20.44
From Chicago, del. to Milwaukee	18.50	18.50	18.00	19.00
From Chicago, Toledo or Detroit, del. to Muskegon, Mich.	20.40	20.40	19.90	20.90
From Granite City, del. to St. Louis	(Granite City base, plus 50-cent switching charge			
Basing Point:				
Birmingham, Ala	13.50	.....	12.50	.....
From Birmingham, del. to:				
Boston	18.62	.....	18.12	.....
Newark, N. J.	19.58	.....	.....	.....
Brooklyn, N. Y.	20.39	.....	.....	.....
Baltimore	19.02	.....	18.52	.....
Philadelphia	18.88	.....	18.38	.....
Cleveland	19.64	.....	18.64	.....
Cincinnati	18.13	.....	17.13	.....
Chicago	18.16	.....	19.14	.....
St. Louis	17.62	.....	17.50	.....
Basing Point:				
Provo, Utah	16.50	.....	.....	.....

LOW PHOS.

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.—$23.00. Basing point: Johnson City, Tenn.—$23.00

Philadelphia, standard and copper bearing 24.13

GRAY FORGE		CHARCOAL	
Valley furnace	17.25	Lake Superior fur.	20.50
Pitts. dist. fur.	17.75	Do., del. Chicago	23.54

SILVERY

Jackson County, O., base; 6%—$22.25; 7—$23.25; 8—$24.25; 9—$25.25; 10—$26.25; 11—$27.75.

BESSEMER FERROSILICON

Jackson County, O., base; 10%—$27.25; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25.

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½% Lower Lake Ports

Old range bess.	$4.30
Mesabi bessemer	4.65
Old range nonbess.	4.65
Mesabi nonbess.	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents, unit, del. E. Pa.

Foundry and basic, 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-65% (nom.)	10.00-10.50

FOREIGN ORE

Cents per unit, f.a.s. Atlantic ports Anom.Q

Foreign manganiferous ore, 45-55% iron, 6-10% man.	10.00
No. Afr. low phos.	9.50
Swedish basic, 65%	9.00
Swedish low phos	9.50
Snapish No. Africa basic, 50 to 60%	9.00
Tungsten, spot, sh. ton unit, duty pd.	$14.00-14.25
N. F. fdy., 55%.....	7.00
Chrome ore 48% gross ton, c.i.f.....	$18.00

Manganese Ore

(Nominal)

Prices, not including duty, cents per unit, cargo lots.

Caucasian, 52-55%	22.00
So. African, 52%....	21.00-22.00
So. Afr., 49-51%....	20.00-21.00
Indian, 58-50%	nominal
Indian, 48-50%	nominal

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pa., Ohio, Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	48.00

Second Quality

Pa., Ohio, Ill., Ky., Md., Mo., Ga., Ala.	40.00

MALLEABLE BUNG BRICK

All bases	50.00

SILICA BRICK

Pennsylvania	$45.00
Joliet, E. Chicago..	54.00
Birmingham, Ala....	55.00

MAGNESITE BRICK

Dead burned grain, Chester, Pa., Baltimore bases, net	40.00
Domes, Chewelah, Wash., base	22.00

Fluorspar

85 and 5 per cent grade

Washed gravel, duey paid, tide, gross ton	$21.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$14.75-15.00

Ferroalloys

(In dollars, except Ferrochrome)

Ferromanganese, 78-82% tidewater, duty paid	85.00
del. Pittsburgh	90.24
Spiegeleisen, 19-20%, dom., fur., spot†	26.00
Ferrosilicon, 50%, freight all., cl.	77.50
Do., less carload..	85.00
Do., 75 per cent....	126-130.00
Spot, $5 a ton higher.	
Silicomang., 2½ carb.	90.00
2% carbon	95.00
1% carbon	105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Do., spot del.	10.00
Ferrotungsten, stand., lb. cont.	1.16- 1.25
Ferrovanadium, 35 to 40%, lb. cont., on analysis	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt., all., lb.	7.00
Do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19%, Rockdale, Tenn., basis; 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand, 50-60%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads. Quan. diff. apply.

Nonferrous Mill Products

F.o.b. mill base, cents per lb. except as specified. Copper, brass products based on 8.00c Con., copper

Steets	
Yellow brass (high	13.75
Copper, hot rolled..	15.00
Lead, cut, to jobbers	7.75
Zinc, 100-lb. base....	9.00
Tubes and Pipes	
High yellow brass..	16.25
Seamless copper.....	16.25
Rods	
High yellow brass..	12.25
Copper, hot rolled..	12.25
Anodes	
Copper, untrimmed	12.75
Wire	
Yellow brass (high)	14.25

Old Metals

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
New York	4.37½-4.62½
Chicago	4.50- 5.00
Cleveland	4.75- 5.25
*St. Louis	4.50- 4.75
Heavy Copper and Wire	
New York	5.87½-6.12½
Chicago, No. 1	5.87½-6.12½
Cleveland	5.50- 6.00
*St. Louis	5.50- 5.75
Composition Brass Borings	
New York	4.12½-4.37½
Light Copper	
New York	5.12½-5.37½
Chicago	4.62½- 4.75
*Cleveland	5.00- 5.25
St. Louis	4.50- 4.75
Light Brass	
Chicago	2.87½-3.12½
Cleveland	2.75- 3.00
Lead	
New York	3.00- 3.25
*Cleveland	2.75- 3.25
*Chicago	2.75- 3.00
St. Louis	2.75- 3.25
Zinc	
New York	2.25- 2.50
Cleveland	2.25- 2.50
Chicago	2.00- 2.25
St. Louis	2.25- 2.50
Aluminum	
Clips, soft, Cleve....	13.00-14.00
*Borings, Cleveland	5.50- 6.50
Mixed, cast Cleve...	8.25- 8.50
*Mixed, cast, St. L..	7.25- 7.75

Secondary Metals

Brass ingot, 85-5-5-5	8.25
Remelt Al., No. 12..	12.00-12.50

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	9.00- 9.50
Boston dealers	5.75- 6.25
Buffalo, No. 1	9.25-10.00
Buffalo, No. 2	8.00- 8.50
Chicago	10.00-10.50
Cleveland, No. 1	9.00- 9.50
Cleveland, No. 2	8.50- 9.00
Detroit, No. 1	8.50- 9.00
Detroit, No. 2	7.50- 8.00
Eastern Pa.	11.00-11.50
Eastern Pa., No. 2	9.00- 9.50
Federal, Ill.	8.00- 8.50
Granite City, Ill.	8.50- 9.00
N. Y., deal. R. R.	8.00
N. Y., deal. No. 2	7.00
Pittsburgh, No. 1	12.50-13.00
St. Louis, No. 1 del.	9.50-10.00
Valleys, No. 1	12.50

COMPRESSED SHEETS

Buffalo, dealers	8.00- 8.50
Chicago, factory	8.00- 8.50
Cleveland	9.00- 9.50
Detroit	8.50- 9.00
E. Pa., new mat.	9.50-10.50
Pittsburgh	12.25-12.75
Valleys	12.00

BUNDLED SHEETS

Buffalo	5.50- 6.00
Cincinnati, del.	5.75- 6.25
Cleveland	6.25- 6.75
Pittsburgh	10.75-11.25
St. Louis	5.00- 5.50

SHEET CLIPPINGS LOOSE

Chicago	5.00- 5.25
Cincinnati	4.50- 5.00
Detroit	5.50- 6.00
St. Louis	4.50- 5.00

STEEL RAILS, SHORT

Birmingham	11.00-11.50
Boston, dealers	5.25- 5.50
Buffalo	12.00-12.50
Chicago (3 ft.)	11.00-11.50
Chicago (2 ft.)	12.00-12.50
Cincinnati, del.	11.00-11.50
Detroit	9.50-10.00
Pitts., (open-hearth 3 ft. and less	14.00-14.50
St. Louis	12.00-12.50

STOVE PLATE

Birmingham	7.00- 7.50
Boston, dealers	4.50- 4.75
Buffalo	9.00- 9.50
Chicago, net	6.50- 7.00
Cincinnati, dealers	6.00- 6.50
Detroit, net	4.50- 5.00
Eastern Pa.	8.50- 9.00
N. Y., deal. fdry.	5.00- 5.50
St. Louis	6.50- 7.00

COUPLERS, SPRINGS

Buffalo	11.50-12.00
Chicago, springs	10.50-11.50
Eastern Pa.	13.50-14.00
Pittsburgh	14.00-14.50
St. Louis	10.25-10.75

ANGLE BARS—STEEL

Chicago	10.50-11.00
St. Louis	9.50-10.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	11.50-12.50
Cleveland, billet, bloom crops	12.50-13.50
Eastern Pa. crops	14.00-14.50
Pittsburgh, billet, bloom crops	16.00-16.50
Pittsburgh, sheet bar crops	14.00-14.50

FROGS, SWITCHES

Chicago	10.00-10.50
St. Louis	9.50-10.00

SHOVELING STEEL

Chicago	9.50-10.00
St. Louis	8.00- 8.50

RAILROAD WROUGHT

Birmingham	7.00- 8.00
Boston, dealers	5.00- 5.50
Buffalo, No. 1	7.00- 8.00
Buffalo, No. 2	9.50-10.00
Chicago, No. 1, net	8.00- 8.50
Chicago, No. 2	9.75-10.25
Cincinnati, No. 2	8.25- 8.75
Eastern Pa.	12.00-12.50
N. Y., No. 1 deal.	7.00- 7.50
St. Louis, No. 1	6.00- 6.50
St. Louis, No. 2	8.50- 9.00

SPECIFICATION PIPE

Boston	4.50- 4.75
Eastern Pa.	9.00- 9.50
New York, dealers	4.75- 5.25

BUSHELING

Buffalo, No. 1	8.00- 8.50
Chicago, No. 1	8.00- 8.50
Cinci., No. 1 deal.	6.00- 6.50
Cincinnati, No. 2	2.50- 3.00
Cleveland, No. 2	7.00- 7.50
Detroit, No. 1 new	7.25- 7.75
St. Louis, No. 1	6.50- 7.00
Valleys, new No. 1	11.00-11.50

MACHINE TURNINGS

Birmingham	3.50- 4.50
Boston, dealers	2.25- 2.50
Buffalo	6.25- 6.75
Chicago	6.00- 6.50
Cincinnati, dealers	4.75- 5.25
Cleveland	7.00- 7.50
Detroit	5.75- 6.25
Eastern Pa.	6.50- 7.00
New York, dealers	2.50- 3.00
Pittsburgh	8.50- 9.00
St. Louis	4.25- 4.75
Valleys	7.50- 8.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	1.75- 2.00
Buffalo	7.00- 7.50
Cincinnati, dealers	4.75- 5.25
Cleveland	7.00- 7.50
Detroit	6.50- 7.00
Eastern Pa.	6.00- 6.50
New York, dealers	2.00- 2.50
Pittsburgh	7.00- 7.50

CAST IRON BORINGS

Birming., plain	4.00- 4.50
Boston, chemical	8.50- 9.00
Boston, dealers	3.25- 3.50
Buffalo	7.00- 7.50
Chicago	6.00- 6.50
Cincinnati, dealers	4.75- 5.25
Cleveland	7.00- 7.50
Detroit	6.50- 7.00
E. Pa., chemical	12.00-15.00
New York, dealers	3.00
Pittsburgh	7.00- 7.50
St. Louis	4.00- 4.50

PIPE AND FLUES

Cincinnati, dealers	4.00- 4.50

RAILROAD GRATE BARS

Buffalo	5.00- 5.50
Chicago, net	7.00- 7.50
Cincinnati	4.75- 5.25
Eastern Pa.	8.50- 9.00
New York, dealers	4.25- 4.50
St. Louis	5.50- 6.00

FORGE FLASHINGS

Boston, dealers	4.00- 4.25
Buffalo	8.00- 8.50
Cleve., over 10 in.	8.50- 9.00
Detroit	7.25- 7.75

FORGE SCRAP

Boston, dealers	4.00- 4.25
Chicago, heavy	10.50-11.00
Eastern Pa.	10.00-10.50

ARCH BARS, TRANSOMS

St. Louis	9.25- 9.75

AXLE TURNINGS

Boston, dealers	3.50- 3.75
Buffalo	7.50- 8.00
Chicago, elec. fur.	9.00- 9.50
Cleveland	9.00- 9.50
Eastern Pa.	11.00
St. Louis	5.00- 5.50

STEEL CAR AXLES

Birmingham	11.00-11.50
Boston, ship. point	8.00- 8.50
Buffalo	10.00-11.00
Chicago, net	10.50-11.00
Eastern Pa.	14.00
St. Louis	11.00-11.50

SHAFTING

Boston, ship. point	10.00-10.25
Eastern Pa.	15.50
New York, dealers	9.50-10.00
St. Louis	9.00- 9.50

CAR WHEELS

Birmingham, iron	8.00- 9.00
Boston, iron deal.	6.00- 6.50
Buffalo, iron	9.00- 9.50
Buffalo, steel	11.00-12.00
Chicago, iron	10.50-11.00
Chi., rolled steel	10.00-10.50
Cincinnati, iron	8.25- 8.75
Eastern Pa., iron	12.00-12.50
Eastern Pa., steel	13.50-14.00
Pittsburgh, iron	11.00-11.50
Pittsburgh, steel	14.00-14.50
St. Louis, iron	8.00- 8.50
St. Louis, steel	9.50-10.00

NO. 1 CAST SCRAP

Birmingham	9.00-10.00
Boston, No. 2	5.50- 5.75
Boston, tex. con.	10.25-10.50
Buffalo, cupola	10.00-10.50
Buffalo, mach.	10.50-11.50
Chicago, agri. net	7.00- 7.50
Chicago, mach. net	8.50- 9.00
Chicago, railroad net	8.00- 8.50
Cinci., mach. cup	8.00- 8.50
Cleveland, cupola	9.00- 9.50
Detroit, net	7.50- 8.00
Eastern Pa., cupola	11.50-12.50
N. Y., cup. deal.	6.00- 6.50
N. Y., del. local foundries	9.00- 9.50
Pittsburgh, cupola	12.50-13.00
San Francisco, del.	13.50-14.00
Seattle	4.50- 6.50
St. Louis, No. 1	8.00- 8.50
St. L., No. 1 mach.	8.50- 9.00

HEAVY CAST

Boston, del.	6.00- 6.25
Buffalo, break.	7.50- 8.00
Cleveland, break.	6.75- 7.00
Detroit, break	6.00- 6.50
Detroit, auto net	8.75- 9.25
Eastern Pa.	11.00-11.50
N. Y., No. 1, deal.	7.00- 7.25
N. Y., break. deal.	6.75- 7.25
Pittsburgh	11.50-12.00

MALLEABLE

Boston, consum.	12.00-12.25
Buffalo	10.50-11.50
Chicago, R. R.	10.50-11.00
Cinci., agri. del.	8.00- 8.50
Cinci., R. R. del.	8.50- 9.00
Cleveland, rail	11.00-11.50
Detroit, auto	7.50- 8.00
St. Louis, R. R.	8.50- 9.00
Eastern Pa., R. R.	11.50-12.50

RAILS FOR ROLLING

5 feet and over

Birmingham	10.00-11.00
Boston, dealers	7.00- 7.25
Buffalo	9.00- 9.50
Chicago	10.50-11.00
Eastern Pa.	12.50
New York, dealer	6.50- 7.00
St. Louis	10.50-11.00

LOCOMOTIVE TIRES

Chicago (cut)	11.00-11.50
St. Louis, No. 1	8.75- 9.25

LOW PHOS. PUNCHINGS

Buffalo	11.00-11.50
Chicago	11.50-12.00
Eastern Pa.	13.50
Pittsburgh	14.00-14.50

Nonferrous Metal Prices of the Week

Spot unless otherwise specified. Cents per pound

	Copper: Electro., del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin New York: Spot	Straits Tin New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 98-99%	Antimony Spot, N. Y.	Ingot Nickel
Dec. 29	8.25	8.37½	8.00	52.50	52.95	4.15	4.05	4.35	*22.90	7.25	35.00
Dec. 30	8.25	8.37½	8.00	53.30	53.75	4.15	4.05	4.35	*22.90	7.25	35.00
Jan. 1—Holiday											
Jan. 2	8.25	8.37½	8.00	53.20	53.80	4.00	3.90	4.35	*22.90	7.25	35.00
Jan. 3	8.25	8.37½	8.00	52.80	53.40	4.00	3.90	4.30	*22.90	7.25	35.00
Jan. 4	8.25	8.37½	8.00	52.75	53.35	4.00	3.90	4.30	*22.90	7.25	35.00
Jan. 5	8.25	8.37½	8.00	52.40	53.00	4.00	3.90	4.30	*22.90	7.25	35.00

*Nominal quotation. Market range 19.90c to 22.90c

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	
Baltimore* ..	2.75c
Boston††	2.90c
Buffalo	2.95c
Chattanooga..	3.26c
Chicago	2.90c
Cincinnati	3.10c
Cleveland	2.90c
Detroit	2.98½c
Houston	3.00c
Los Angeles..	3.40c
New Orleans	3.00c
New York‡(d)	3.17c
Pittsburgh	2.85c
Philadelphia*	2.75c
San Francisco	3.55c
Seattle	3.40c
St. Louis	3.14c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS	
Portland	3.40c
San. Fran.	3.55c
Baltimore*	2.75c
Baltimore* ...	2.60c
Chattanooga..	3.26c
Chicago	2.75c
Cincinnati	3.10c
Detroit	2.98½c
New York‡(d)	3.10c
Philadelphia*	2.75c
St. Louis	3.14c
Tulsa	3.25c

REINFORC. BARS	
Boston 2.75c-3.25c	
Buffalo	1.95c
Chattanooga..	3.26c
Chicago 1.95c-2.10c	
Cleveland (c)	1.97½c
Cincinnati	3.10c
Houston	3.00c
Los Ang., cl...	3.10c
New Orleans	3.00c
New York	3.17c
Philadelphia..	2.62½c
Pitts., plain...	3.00c
Pitts., twisted squares	3.12½c
Seattle	3.50c
St. Louis	3.29c
Tulsa	3.25c
Young. 2.30c-2.60c	

SHAPES	
Baltimore* ...	2.60c
Boston††	3.07c
Buffalo	3.20c
Chattanooga..	3.46c
Chicago	3.10c
Cincinnati	3.30c
Cleveland	3.21c
Detroit	3.30c
Houston	3.00c
Los Angeles..	3.40c
New Orleans	3.50c
New York(d)	3.27c
Philadelphia*	2.75c
Pittsburgh	3.05c
Portland	3.40c
San Francisco	3.50c
Seattle	3.40c
St. Louis	3.34c
St. Paul	3.25c
Tulsa	3.50c

PLATES	
Baltimore*	2.75c
Boston††	3.08c
Buffalo	3.20c
Chattanooga..	3.46c
Chicago	3.10c
Cincinnati	3.30c
Cleveland, ¼ in. and thicker.	3.21c
Cleve., ⅜-in.	3.20c
Detroit	3.30c
Det., ⅜-in.....	3.10c
Houston	3.00c
Los Angeles..	3.40c
New Orleans	3.50c
New York(d)	3.30c
Philadelphia*	2.75c
Phila. floor....	4.35c
Pittsburgh	3.05c
Portland	3.40c
San Fran.	3.50c
Seattle	3.40c
St. Louis	3.34c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE	
Baltimore* ..	2.95c
Boston††	2.90c
Buffalo	3.10c
Chattanooga..	3.26c
Chicago	2.95c
Cincinnati	3.10c
Cleveland	3.01c
Det., 8-10 ga.	3.03½c
Houston	3.60c
Los Angeles..	3.65c
New Orleans	3.50c
New York	3.17c
Portland	3.65c
Philadelphia*	2.95c
Pittsburgh	2.85c
San Fran.	3.75c
Seattle	3.65c
St. Louis 3.19c-3.36c	
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK	
Baltimore*†..	3.50c
Boston††	3.75c
Buffalo	3.25c
Chattanooga..	4.01c
Chicago	3.70c
Cincinnati	3.85c
Cleveland	3.76c
Detroit	3.78½c
Los Angeles..	4.15c
New York	3.65c
Philadelphia*†	3.40c
Pittsburgh	3.35c
Portland	4.25c
San Fran.	4.25c
Seattle	4.25c
St. Louis	3.94c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS	
Baltimore*†..	3.75c
Buffalo	4.00c
Boston	4.60c
Chattanooga..	4.61c
Chicago 4.20c-4.30c	
Cincinnati	4.45c
Cleveland	4.36c
Detroit	4.45c
Houston	3.57c
Los Angeles..	4.75c
New Orleans	4.35c
New York	4.25c
Pitts.** 3.90c-4.20c	
Portland	4.85c
San Fran.	4.85c
Seattle	4.85c
St. Louis	4.54c
St. Paul	4.19c
Tulsa	5.10c
Phila.*†	4.00c

BANDS	
Baltimore	3.05c
Boston††	3.15c
Buffalo	3.30c
Chattanooga..	3.71c
Chicago	3.20c
Cincinnati	3.35c
Cleveland	3.26c
Detroit, ⅜-in. and lighter	3.28½c
Houston	3.25c
Los Angeles..	3.80c
New Orleans	3.20c
New York(d)	3.42c
Philadelphia..	3.05c
Pittsburgh	3.10c
Portland	3.90c
San Fran.	3.15c
Seattle	3.90c
St. Paul	3.20c
Tulsa	3.45c
St. Louis	3.44c

HOOPS	
Baltimore	2.80c
Boston	4.15c
Buffalo	2.55c
Chicago	3.20c
Cincinnati	3.35c
Det., No. 14 and lighter	3.28½c
New York	3.42c
Philadelphia..	3.30c
Pittsburgh	3.75c
Seattle	5.40c
St. Paul	3.75c

COLD FIN. STEEL	
Baltimore (c)	3.56c
Boston 3.83c-4.33c	
Buffalo	3.25c
Chattanooga*	3.91c
Chicago	3.50c
Cincinnati	3.70c
Cleveland	3.40c
Detroit	3.40c
Los Ang.(f)..	5.95c
New Orleans	4.25c
New York...3.92c-4.42c	
Philadelphia..	3.73c
Pittsburgh	3.35c
Portland (f)..	4.75c
San Fran. (f)	5.95c
Seattle (f)....	4.75c
St. Paul	3.20c
St. Louis.....	3.74c
Tulsa	4.65c

COLD ROLL. STRIP	
Boston, 0.100-in., 500 lb. lots	5.20c
Buffalo	5.25c
Chicago (b)..	5.65c
Cincinnati	5.80c
Cleveland (b)	5.55c
Detroit	5.40c
Philadelphia..	4.55c
New York.....	4.55c
St. Louis	5.74c

(b) Net base, straightening, cutting, boxing, 1 ton or more.

(c) Plus mill, size and quantity extras.

(d) Minus quant. diff.

(e) New mill classif.

(f) Rounds only.

‡Domestic bars.

*Plus. quan. extras.

**Under 25 bundles.

*†50 or more bundles.

†New extras apply.

††Base 40,000 lbs., extras on less.

Prices at Detroit, Cleveland, Chicago, Pittsburgh, Cincinnati, Chattanooga, NewYork, Boston, St. Louis on heavier lines are subject to new quantity differentials:

399 pounds and less, up 50 cents; 400 to 9999 pounds, base; 10,000 to 19,999 pounds, 15 cents under; 20,000 to 39,999 pounds, 25 cents under; 40,000 pounds and over, 35 cents under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Jan. 4

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

PIG IRON	British gross tons U. K. ports £ s d		Continental Channel or North Sea ports, metric tons Gold parity, $4.8665 £ s d	
Foundry, 2.50-3.00 Silicon.	$15.06	2 18 6	$8.88	1 16 6
Basic bessemer.....	13.91	2 14 0*	7.30	1 10 0
Hematite, Phos. .03-.05....	15.45	3 0 0	....	.....
SEMIFINISHED STEEL				
Billets.....	$28.33	5 10 0	$11.44	2 7 0
Wire rods, No. 5 gage.....	40.17	7 16 0	21.90	4 10 0
FINISHED STEEL				
Standard rails.....	$39.91	7 15 0	$26.77	5 10 0
Merchant bars.....	1.61c	7 0 0	.69c	3 2 6
Structural shapes.....	1.70c	7 7 6	.63c	2 17 6
Plates, †¼ in. or 5 mm.....	1.84c	8 0 0	.89c	4 1 0
Sheets, black, 24 gage or 0.5 mm.....	2.13c	9 5 0	1.27c	5 15 0
Sheets, gal., 24 gage, corr...	2.59c	11 5 0	1.65c	7 10 0
Bands and strips.....	1.84c	8 0 0	.85c	3 17 6
Plain wire, base.....	2.13c	9 5 0	1.18c	5 7 6
Galvanized wire, base.....	2.53c	11 0 0	1.38c to 1.40c	6 5 6 to 6 7 6
Wire nails, base.....	2.76c	12 0 0	1.27c	5 15 0
Tin plate, box 108 lbs.....	$ 4.25	0 16 6	....	.....

British ferromanganese $82 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

		£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5.....	$16.09	3 2 6(a)	$13.39	215	$13.48	305	$23.89	63
Basic bessemer pig iron....	16.74	3 5 0(a)	*11.53	185	12.82	290	26.35	69.50
Furnace coke.....	3.86	0 15 0	7.48	120	4.86	110	7.30	19.25
Billets.....	28.33	5 10 0	25.23	405	19.45	440	36.59	96.50
Standard rails.....	1.90c	8 5 0	1.96c	700	2.20c	1,100(b)	2.27c	132
Merchant bars.....	1.75c	7 12 6	1.57c	560	1.07c	535	1.89c	110
Structural shapes.....	2.01c	8 15 0	1.54c	550	1.07c	535	1.85c	107.50
Plates, †¼-in. or 5 mm.....	1.96c	8 10 0	1.90c	680	1.35c	675	2.18c	127
Sheets, black.....	2.36c	10 5 0§	2.38c	850‡	1.50c	750‡	2.48c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.....	2.93c	12 15 0	4.06c	1,450	3.00c	1,500	6.36c	370
Plain wire.....	2.13c	9 5 0	3.16c	1,130	2.20c	1,100	3.04c	177
Bands and strips.....	2.42c	10 10 0	1.82c	650	1.35c	675	2.18c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. a del. Middlesbrough. b Since January.

Bars

Bar Prices, Page 30

Following heavy shipments to meet specifications for soft steel bars at the close of fourth quarter, demand and production have declined.

While there has been some covering on commercial steel bars in New England, specifications are light.

Cleveland bar sellers booked some substantial orders for automotive rim stock during the week. Railroads there are taking bids on first quarter bars, plates and shapes.

Bar specifications in Eastern Pennsylvania have decreased sharply. Railroad buying is expected to provide the next important impetus to sales. The market is 1.75c, Pittsburgh, or 2.04c, Philadelphia.

Since Jan. 1 buyers have had little interest in the bar market at Pittsburgh but it is expected a revival in buying will be under way before February. Carbon bars are firmly quoted at 1.75c, Pittsburgh, and an advance is expected to be announced some time this month.

Soft steel bar demand in the Chicago district shows the quiet characteristic of the first week of the new year with new business retarded additionally by large tonnages shipped late in December. Demand for bar iron from farm implement and frog and switch manufacturers is increasing. This product continues 1.60c, Terre Haute, Ind.

Steel bar sellers at New York are looking to railroads to provide principal demand. Commercial steel bars at 1.75c, Pittsburgh, or 2.08c, New York, are unchanged.

Plates

Plate Prices, Page 30

Reduced production of steel plates is the result of unusually heavy shipments at the end of the year, most users having sufficient stocks for immediate needs.

Aside from barge repair work in the Pittsburgh district, plates for floating equipment are in slow demand. A small export order for three lighters was awarded to a Pittsburgh barge builder. Plates are firm at 1.70c, Pittsburgh; an advance for second quarter is being considered.

Chicago reports better business in prospect as a result of plans for railroad equipment and repair work.

It is believed that railroad tonnage of plates will be a more stimulating factor in the Philadelphia market soon. Meanwhile, ship tonnage is manifesting a steadying influence. Prices are unchanged at 1.80c, Coatesville, Pa., or 1.88½c, Philadelphia.

Specifications against plate contracts at 1.80c, Coatesville, by New England users are expected to be heavier than in fourth quarter. Ceiling for the Boston-Easton traffic tunnel will require a substantial tonnage of stainless steel panels, grilles, slides and frames; bids are in.

White Motor Co., Cleveland, has booked 76 armored cars for the army ordnance department, each requiring approximately 1000 pounds of armor plate 3/16-inch to ¼-inch, on which bids are being taken. Some delay has been encountered in signing the general contract for that portion of Cleveland's easterly sewage plant requiring 1200 tons of plates for tanks.

Buying of steel plates in the New York market has started slowly but prospective ship work promises a better condition soon. The quotation is steady at 1.80c, Coatesville, Pa., or 1.95c, New York. Fairly large buying of plates for ship repair work features the New York market.

Contracts Placed

6168 tons, bureau of supplies and accounts, navy, Washington, delivery Brooklyn, Philadelphia and Charleston, S. C.; 2000 tons to Central Iron & Steel Co.; 1115 tons, Bethlehem Steel Co.; 790 tons, American Sheet & Tin Plate Co.; 1263 tons, Worth Steel Co.; 1000 tons, Lukens Steel Co.; bids Dec. 1.

400 tons, three coast guard cutters, to Bethlehem Steel Co., Bethlehem, Pa.; Lake Union Dry Dock & Machine Works, Seattle, general contractor.

300 tons, water tanks, Santa Cruz, Calif., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

240 tons, three lighters, each 100 x 27 feet, for export to the Far East, to American Bridge Co., Pittsburgh.

165 tons, plates and shapes, 400,000-gallon water storage tank for Galion, O., to Chicago Bridge & Iron Works, Chicago.

150 tons, conduit forms, metropolitan water district, Los Angeles, to unnamed interest.

125 tons, 1,000,000-gallon oil tank, Reilly Tar & Chemical Co., Newark, N. J., to Hammond Iron Works, Warren, Pa.

115 tons, boiler barge, Texas Oil Co., Houma, La., to Pennsylvania Shipyards Inc., Beaumont, Tex.

Contracts Pending

1650 tons, bureau of supplies and accounts, navy, Washington, delivery Brooklyn and Philadelphia, schedule 1344; bids Dec. 22.

900 tons, welded plate steel pipe, Snivley and Owyhee river siphons, north canal, Mitchell Butte division, Owyhee project, Oregon-Idaho; bids Jan. 15, bureau of reclamation, Denver.

400 tons, buoys, various types, lighthouse bureau, Staten Island, N. Y.; openings Jan. 17 and 29.

125 tons, water tank, Trenton, Mo. Applied for loan.

110 tons, 24-inch welded pipe, ¼-inch plates, Inglewood, Calif.; bids opened.

Unstated tonnage, 150,000-gallon elevated water tank, state prison colony, Norfolk, Mass.; readvertised Jan. 16.

Unstated tonnage, 100,000-gallon elevated steel tank, Mount Pleasant, S. C.; also several hundred tons cast iron pipe; granted federal loan.

Sheets

Sheet Prices, Page 30

Delays in production of new automobile models is having an adverse effect on demand for sheets. A large portion of the tonnage which was expected to develop in January now is not anticipated until February.

At Chicago sheet orders are relatively more active than that for practically any other steel product. Automotive buying there is expanding and providing the principal support to incoming business. The volume of cold-rolled sheet business has improved.

Although current operations in Pittsburgh district sheet mills are averaging 27 to 28 per cent, the outlook is for improvement. Prices are firm, with black sheets 2.25c base, Pittsburgh; galvanized, 2.85c; and autobody, 2.30c for No. 10 gage, and 2.75c for No. 20 gage.

Producers and distributors at St. Louis report a lull in activities, users being well stocked.

Specifications from radio and stove manufacturers are exerting a mildly sustaining influence on sheet business at Philadelphia.

The Cleveland sheet mills were down last week, but some production is scheduled for this week. The mills in an adjacent lake district, 75 per cent of whose product goes to Michigan automotive manufacturers, worked at 50 per cent last week.

Refrigerator manufacturers are getting ready to go into production on new models. Steel barrel manufacturers are formulating an aggressive trade promotion program among brewers, and sheetmakers look for more business from this source.

In New England buyers are covering cautiously for first quarter, though discussion of price increases for some finishes is expected to drive in more business.

New York reports sheet specifications continuing at the meager rate of the past several weeks, with prices unchanged.

Shapes

Structural Shape Prices, Page 30

Fabricators see little prospect of an early improvement in private building, but a large volume of public construction is pending.

At Chicago, structural steel awards for more than 5500 tons include 1500 tons of piling for a sea wall at Hickman, Ky., a similar tonnage of shapes for a Joliet, Ill., bridge, and 1000 tons for the river lock at Saverton, Mo.

Inquiry at Pittsburgh is slightly more active, and includes a 2400-ton spillway for a railroad in Louisiana. Plain structural shapes are firm at 1.70c base, Pittburgh. An advance is reported imminent for the second quarter.

Inequalities in wage rates and working schedules as between fabricating shops in eastern Pennsylvania and those in certain other sections are said to be working to the disadvantage of eatern shops. Until the fabricators' code has been approved these inequalities are expected to continue.

The Pennsylvania legislature has approved the proposal of a syndicate for building a tunnel under the Delaware river bridge. Similar approval is expected to be granted by the New Jersey state legislature within a few weeks. Steel tonnage for the project has not yet been determined.

Including 12,000 tons for two highway bridges over the Cape Cod canal, Bourne and Sagamore, Mass., close to 16,000 tons pends in New England.

Structural awards in the New York district are light, but close to 20,000 tons are pending there.

At Cleveland 515 tons of sheet piling was placed with Carnegie Steel Co., for United States coast guard work, that city. Plans have not yet been prepared for the Muskingum county, Ohio, water conservancy project, government financed, which this year will require a substantial tonnage of sheet piling.

Independent structural shops in the South, favored by better building demand in that section, have heavier backlogs.

Contracts Placed

2995 tons, bureau of supplies and accounts, navy, Washington, for delivery to Brooklyn, Philadelphia, and Charleston, S. C., to Bethlehem Steel Co., Bethlehem, Pa., and John T. Hill, Baltimore. Small lot to Carnegie Steel Co., Pittsburgh. Opening of Dec. 1, schedule 1187.

1500 tons, piling, sea wall, Hickman, Ky., to Jones & Laughlin Steel Corp., Pittsburgh.

1500 tons, Ruby street bridge, Joliet, Ill., to Milwaukee Bridge Co., Milwaukee.

1000 tons, lock No. 22, Saverton, Mo., to Independent Bridge Co., Pittsburh.

850 tons, railroad bridge, grade elimination, East Aurora, N. Y., to Mount Vernon Bridge Co., Mount Vernon, O.

785 tons, two air corps hangars, Barksdale Field, Shreveport, La., to Austin Bros. Bridge Co., Atlanta, Ga.; James T. Taylor, Fort Worth, Tex., general contractor.

660 tons, addition, United States Potash Co. refinery, Loving, N. Mex., to Virginia Bridge & Iron Co., Roanoke, Va.

515 tons, sheet piling, United States coast guard work, Cleveland, to Carnegie Steel Co., Pittsburgh.

440 tons, railroad grade separation, Quogue-Southampton, state bridge, project RC 3512, Suffolk county, New York, to McClintic-Marshall Corp.; P. T. Cox Construction Co. Inc., New York, general contractor.

430 tons, state highway bridge, Hampton Bays, N. Y., to McClintic-Marshall Corp., Bethlehem, Pa.

400 tons, buildings, Fort Bliss, Texas, Darbyshire Harvie Co., El Paso, Tex.; through Ramey Bros.

390 tons, state highway bridge, Poland, Pa., to Fort Pitt Bridge Works, Pittsburgh.

350 tons, piling, emigration building, Gloucester, N. J., to Kalman Steel Corp., Bethlehem, Pa., through Thomas Earle & Sons, Philadelphia.

340 tons, state bridge 499C, Cherokee-Houston counties, Texas, to Houston Structural Steel Co., Houston, Tex.

325 tons, bridge, Medicine Lodge, Kans., to Missouri Valley Bridge & Iron Co., Leavenworth, Kans.

325 tons, I-beams, navy opening on schedule 900-7150, Dec. 1, to Jones & Laughlin Steel Corp., Pittsburgh.

300 tons, state highway bridge, Buena Vista, Va., to Roanoke Iron & Bridge Works Inc., Roanoke, Va.; Preston & Pollard, general contractors.

268 tons, buildings, veterans' hospital, Roanoke, Va., to Virginia Bridge & Iron Co., Roanoke, Va.; Algernon Blair, Montgomery, Ala., general contractor.

225 tons, brewery, Detroit, to Whitehead & Kales Co., Detroit.

200 tons, state highway bridge, Picture Rocks, Pa., to Lackawanna Steel Construction Corp., Buffalo.

190 tons, school, Clinton, Iowa, to Clinton Bridge Works, Clinton.

170 tons, bridge on Iowa division of Chicago & North Western railroad to McClintic-Marshall Corp., Bethlehem, Pa.

150 tons, paper mill building, Green Bay, Wis., to Wisconsin Bridge & Iron Co., Milwaukee.

150 tons, gun shed, Fort Sill, Oklahoma, to J. B. Klein Iron Foundry Co., Oklahoma City, Okla.

146 tons, bridge approach, Ouachita river, Arkansas, to Pidgeon-Thomas Iron Co., Memphis, also 44 tons of reinforcing steel; J. W. Hecker & Son, Camden, Ark., general contractor.

126 tons, highway and bridge, Baltimore-Harford, Maryland, to McClintic-Marshall Corp., Bethlehem, Pa.; Frank Carozza & Sons Inc., Baltimore, general contractor. National Building Supply Co., Baltimore, awarded 73 tons of reinforcing bars.

126 tons, Tongue river bridge, Sheridan county, Wyoming, to unnamed interest.

125 tons, bridge, Flagstaff, Ariz., to Allison Steel Mfg. Co., Phoenix, Ariz.

125 tons, bridge, St. Clair county, Illinois, to Vincennes Bridge Co., Vincennes, Ind.

125 tons, Napanock bridge No. 18, Ulster county, New York, to American Bridge Co., Pittsburgh; Manstin Engineering Corp., Bound Brook, N. J., general contractor.

120 tons, bridge, route No. 6, Bergen county, New Jersey, to American Bridge Co., Pittsburgh.

110 tons, shapes and bars, bridge and approaches, Santa Fe river road 2, Alachua-Columbia counties, Florida; 88 tons of shapes to Bethlehem Fabricators Inc.; 22 tons of bars to Dudley Bar Co.; W. L. Cobb, Tampa, Fla., general contractor.

100 tons, shapes and bars, postoffice, Independence, Mo., to Chester Iron Works, St. Louis, and Truscon Steel Co., Youngstown, O.; C. V. King, general contractor.

100 tons, state bridge at Snoqualmie, Wash., to Steel Fabricators Inc., Seattle.

100 tons, three coast guard cutters at Seattle, Wash., to Bethlehem Steel Co., Bethlehem, Pa.; Lake Union Dry Dock & Machine Works, Seattle, general contractor.

100 tons, pipe line structure, Calaveras pipe line, Hetch Hetchy project, San Francisco, to unnamed interest.

Shape Awards Compared

	Tons
Week ended Jan. 6	**14,961**
Week ended Dec. 30	**13,417**
Week ended Dec. 23	**18,065**
This week in 1932	**7,965**
Weekly average for 1933	**15,413**
Weekly average, Dec.	**22,058**
Total for 1933	**801,493**
Total to date, 1934	**14,961**

Contracts Pending

12,000 tons, superstructures, two highway bridges, Cape Cod canal, Bourne and Sagamore, Mass.; American Bridge Co., Pittsburgh, Pa., low, at $1,444,730, bidding 4.72c on 4800 tons of carbon steel and 5.33c on 6850 tons of silicon steel, in place.

2400 tons, spillway, Norco, La., for Louisiana & Arkansas Railway Co., Minden, La.

940 tons, also 95,350 square feet of steel sheet piling, lock No. 12, Mississippi river, Bellevue, Iowa; bids Jan. 23 to United States engineer, Rock Island, Ill.

900 tons, state overhead crossing, Fourth avenue south, Seattle; bids Jan. 9.

800 tons, Illinois Central railroad viaduct, Big Clifty, Ky.

600 tons, towers, cableways, Norris dam, Tennessee valley authority; McKiernan Terry Corp., New York, low on complete job, towers, cable hoists, etc. Virginia Bridge & Iron Co., Roanoke, Va., low on towers alone. John A. Roebling's Sons Co., Trenton, N. J., low on 3600 feet, 3-inch cable.

600 tons, bureau of supplies and accounts, navy, Washington, for delivery to Brooklyn and Philadelphia; bids Dec. 22.

450 tons, bridge, Burlington, Kans.

432 tons, bridge to carry plate steel pipe and road for Owyhee river siphon, North canal Mitchell Butte division, Oregon, Idaho; bids Jan. 15, bureau of reclamation, Denver.
400 tons, highway bridge, Alabama.
400 tons, turbine foundation, for Philadelphia Electric Co., Philadelphia.
385 tons, piling and shapes, Campostella bridge, eastern branch, Elizabeth river, Norfolk, Va.; readvertised Jan. 18.
325 tons, bridges, Barber county, Kansas.
325 tons, bridge, Pensacola, Fla.
300 tons, bridge, Milk river, federal engineer, Kansas City, Mo.; Minneapolis Bridge Co., Minneapolis, low, $56,255.35, Dec. 18.
278 tons, Eel river bridge, Humboldt county, California, for state; bids Jan. 3.
220 tons, state highway bridge, Chesterton, Md.
205 tons, spans, Missouri Pacific railroad, St. Louis.
200 tons, bridge, Allegheny county, Pennsylvania; bids Jan. 19.
200 tons, building, for Brook Hall Dairy Co., Hamden, Conn.
150 tons, building, for Brown Buick Co., White Plains, N. Y.
135 tons, crossing at Beta, Logan county, Colorado, for state; bids opened.
100 tons, state bridge, Delaware; bids in Jan. 7.
Unstated tonnage, approach to Garnier's Bayou bridge, Okaloosa county, Florida; Nashville Bridge Co., Nashville, Tenn., low.

Reinforcing

Reinforcing Bar Prices, Page 31

The new billet steel reinforcing bar market is quiet following heavy December shipments, and new building projects are developing slowly. Prices are firm, with bases at Pittsburgh, 1.80c on mill lengths, and 1.90c on cut lengths.

A $2,000,000 federal loan has been granted to complete construction of the Allegheny General hospital at Pittsburgh, work on which was stopped in 1931 when a $6,500,000 private fund was exhausted. This will require a substantial tonnage of reinforcing material.

Road building programs in various states are contributing only small lots, due to the period of the year, but some additional orders have been received for river lock construction.

Pending tonnage in New England is heavy, led by requirements for the Fore river bridge substructure, Quincy-Weymouth, Mass., and the parcel post building, Boston.

Slightly heavier requirements for highways and bridges are noted in New York and New Jersey.

Contracts Placed

1100 tons, substructure, two highway bridges, Cape Cod canal, Bourne-Sagamore, Mass., to Concrete Steel Co., Boston; through P. J. Carlin Construction Co. Project also includes 125 tons of welded trusses, to Kalman Steel Corp., Bethlehem, Pa.
394 tons, reclamation service, Boulder City, Colo., schedule 23040-A, to Inland Steel Co., Chicago; bids Dec. 5.
350 tons, lock No. 5-A, Winona, Minn., to Inland Steel Co., Chicago.
200 tons, state paving and highway work in Washington, to Pacific Coast Steel Corp., Seattle.
200 tons, sewage disposal plant, Green Bay, Wis., to Truscon Steel Co., Youngstown, O.
175 tons, Tacoma seawall and Fort Lewis construction, to Pacific Coast Steel Corp., Seattle.
158 tons, highway work in four counties for California, to unnamed interests.
150 tons, state highway jobs in Washington, to Northwest Steel Rolling Mills, Seattle.
130 tons, state overhead crossing in Pierce county, Washington, to Pacific Coast Steel Corp., Seattle.
100 tons, or more, Fort Benning, Georgia, to Kalman Steel Corp., Bethlehem, Pa.; schedule 54, Dec. 8.
100 tons, highway, Knox county, Tennessee, to Kalman Steel Corp., Bethlehem, Pa.; Pittman Construction Co., Atlanta, general contractor.
100 tons, Arro yo Seco channel, Los Angeles, Calif., to unnamed interest.
100 tons, bridges, Interborough parkway, Queens county, New York, to Truscon Steel Co., Youngstown, O.; through M. A. Cardo Engineering Co.
100 tons, mesh and bars, railroad grade crossing, Quogue-Southhampton, Suffolk county, New York, to Kalman Steel Corp., Bethlehem, Pa.; through P. T. Cox Co., New York.
Unstated tonnage, Georgia Hotel, Rome, Ga., to Truscon Steel Co., Youngstown, O.; Upchurch Construction Co., Montgomery, Ala., general contractor.

Contracts Pending

600 tons, state road work, Butler county, Pennsylvania; York Engineering & Construction Co., York, Pa., awarded general contract.
558 tons, lock 12, Mississippi river, Bellevue, Iowa; bids Jan. 23 to United States engineer, Rock Island, Ill. Project also takes 92 tons of steel forgings, and 55 tons of steel and alloy forgings.
385 tons, Campostella bridge, eastern branch, Elizabeth river, Norfolk, Va.; readvertised Jan. 18.
310 tons, Queens approach foundations for Triboro bridge, New York; bids Jan. 19.
200 tons, state overhead crossing in Seattle; bids Jan. 9.
125 tons, classroom building, Howard University, Washington, to Concrete Steel Co., New York; Consolidated Engineering Co., Baltimore, general contractor.

Concrete Awards Compared

	Tons
Week ended Jan. 6	**3,257**
Week ended Dec. 30	**3,648**
Week ended Dec. 23	**2,685**
This week in 1932	**2,867**
Weekly average for 1933	**3,771**
Weekly average, Dec.	**5,283**
Total for 1933	**196,101**
Total to date, 1934	**3,257**

Strip Steel

Strip Prices, Page 31

Automotive consumption of steel strip provides some activity in the market.

Rollings were not scheduled in several Pittsburgh district strip mills last week owing to the pronounced drop in specifications. Although a few first quarter contracts have been closed at 1.75c, Pittsburgh, on hot-rolled strip, and 2.40c, Pittsburgh, on cold-rolled strip, there has been little spot tonnage in the market.

At Cleveland some fairly good orders were received, mainly from automotive interests, and sellers were encouraged with the outlook. Contracts for first quarter are under negotiation.

Strip demand has shown no evidences of revival at Philadelphia. There have been no new price developments.

Strip demand at Chicago from automotive interests is slightly more active, with little change noted in requirements of miscellaneous consumers. Consumers are generally slow to order far ahead with the market unchanged at 1.85c, Chicago, for hot strip and 2.40c, Pittsburgh-Cleveland, for cold-rolled strip.

Cold-rolled strip consumers in the Boston area are covering slowly and shipping orders are light. Cold strip is firm at 2.60c, Worcester, Mass.

Railroads

Track Material Prices, Page 31

Approval by the PWA of a loan of $77,000,000 to the Pennsylvania for completion of its electrification program between Washington and Wilmington, Del., and construction of 7000 freight cars and 100 electric locomotives, paves the way for release of heavy steel tonnages.

Except possibly 8000 tons for yard poles, little new buying of structurals is expected for this electrification program. Some believe even this tonnage may go against old contracts. Of the original tonnage placed, about 40,000 tons is yet to be released. Orders for electric locomotives were placed months ago but much of the steel for that purpose was not ordered at that time.

Interstate commerce commission has approved borrowing of $11,845,750 by the Erie and $2,199,999 by the Lehigh Valley. New York Cen-

tral is said to be planning purchase of 40,000 tons of rails for its 1934 program. Baltimore & Ohio is considering heavy repairs to 5000 freight cars and 175 locomotives.

Probably more than 400,000 tons of rolled steel will be required for construction of 7000 cars for the Pennsylvania, 8000 for the New York Central and 12,775 for the Van Sweringen lines.

New York Central will open bids Jan. 16 on its miscellaneous requirements of sheets, plates, bars, pipe, axles, billets, tubes, wire, nails, bolts, nuts and rivets.

Railroads with headquarters at Cleveland are taking bids on unstated tonnages of plates, shapes and bars and miscellaneous materials required for first quarter.

Domestic freight car buying in December totaled 316, making the total cars placed during the year 2460, compared with 1739 in 1932. Comparisons follow:

	1933	1932	1931	1930
Jan.	3	159	100	5,072
Feb.	0	35	50	17,027
March	5	105	2,166	6,118
April	50	0	2,798	1,997
May	8	60	20	1,392
June	500	0	1,910	998
July	306	25	617	1,389
Aug.	202	5	1,304	1,111
Sept.	23	1,298	703	576
Oct.	514	0	980	4,116
Nov.	533	2	35	2,621
Dec.	316	50	11	2,729
Total	2,460	1,739	10,694	45,146

Car Orders Placed

Pennsylvania Salt Mfg. Co., Philadelphia, two tank cars, to American Car & Foundry Co., New York.

Rail Orders Placed

220 tons, New York board of transportation, to Bethlehem Steel Co., Bethlehem, Pa.; bolts and spikes to Oliver Iron & Steel Corp., Pittsburgh.

Car Orders Pending

Chesapeake & Ohio, 15 passenger, 11 mail and express cars; bids asked for Jan. 31.

Chicago, Milwaukee, St. Paul & Pacific, 50 passenger cars and 25 combination passenger and baggage cars.

Chilean State Railways, 20 passenger cars; inquiry current.

Nickel Plate, seven passenger, one mail and express car; bids asked for Jan. 31.

Norfolk & Western, 10 deluxe passenger coaches and eight deluxe combination pasenger and baggage cars; bids Jan. 10.

Cold Finished

Cold Finished Prices, Page 31

Pittsburgh — The cold-finished steel market finds a noticeable lack of new business after the heavy December bulge. Advanced prices on cold-finished steel bars and turned and ground shafting now are quoted firmly. On cold-finished steel bars the base at Pittsburgh is 2.10c; at Cleveland and Chicago, 2.15c; at Buffalo, 2.20c; at Detroit 2.30c, and eastern Michigan 2.35c.

Pipe

Pipe Prices, Page 31

Pipe mills have practically no unfilled tonnage on their books and present production is largely for building up stock sizes. Movement of oil country goods is slow but should pick up later this quarter. Inquiries for important tonnages of line pipe for Russia and a Wichita, Kans., oil interest, reported in the Pittsburgh district several weeks ago, appear to have been postponed indefinitely. Electric weld pipe in sizes down to 8⅝ inches will be in production soon at the Brier Hill plant of Youngstown Sheet & Tube Co. as a result of equipment changes. Further changes contemplated will permit production of sizes down to 2-inch.

Closing of various municipal projects in Chicago is slow. Laying of pipe for numerous water and sewage disposal lines will be speeded up with the approach of warmer weather. Plans are progressing for the early release of old orders for work in the Chicago sanitary district and bids are expected to be asked in the near future on additional pipe for this project.

Several thousand tons of cast pipe are up for early bidding in the New York district. Some small inquiries are out for utilities. Increasing tendency to erect refineries near oil fields is expected further to restrict pipeline tonnage.

Cast Pipe Placed

300 tons, 2 to 10-inch, Rosiclare, Ill., to McWane Cast Iron Pipe Co., Birmingham, Ala.

250 tons, various sizes, Macon, Ill., to James B. Clow & Sons, Chicago.

100 tons, approximately, 12-inch, Beaumont, Tex., to American Cast Iron Pipe Co., Birmingham, Ala.

Unstated tonnage, 7000 lineal feet, 6 and 8-inch, class 150, war department, Fort Monroe, Virginia, to American Cast Iron Pipe Co., Birmingham, Ala.; also unstated tonnage of valves and fittings, to M. & H. Valve & Fittings Co., Anniston, Ala.

Steel Pipe Placed

Unstated tonnage, 370 lengths shore pipe, each 16 feet 3 inches, federal engineer, Philadelphia, to Lancaster Iron Works, Lancaster, Pa.

Cast Pipe Pending

203 tons, fittings for 3 to 24-inch pipe, Chicago; bids Jan. 15, to commissioner of public works.

Wire

Wire Prices, Page 31

Wire shipments have declined sharply as a result of large tonnages moved in December. A quiet period is anticipated for a few weeks pending consumption of stocks.

The automotive industry is taking slightly larger lots from Chicago makers. Jobbers have only moderate stocks and anticipate gradual improvement in demand from farming districts over coming months. New contracting, while slightly more active, still is slow at $2.25, Chicago, for plain wire and $2.40 for wire nails.

Little test of advanced prices has been made in the Pittsburgh market. Prices are $2.35, Pittsburgh, per keg, on nails, with plain wire 2.20c and high carbon spring wire 3.10c.

New orders at Cleveland during the week were light, consumers completing inventories.

A. Leschen & Sons Rope Co., St. Louis, has booked 210,000 feet of ⅜-inch strand for the federal engineer at Kansas City, Mo., at $2937.90, delivered.

Incoming business to New England wire mills is light. Mills are busy rebuilding stocks.

Bolts and Nuts

Bolt, Nut, Rivet Prices, Page 31

The bolt, nut and rivet market is quiet, at 70 off for bolts and nuts, 2.75c, Pittsburgh, and 2.85c, Chicago, for large rivets. Wrought washers are 6.00 to 6.25 off list.

Pittsburgh producers look to car-building programs of the Pennsylvania, New York Central and Van Sweringen lines to bring out several thousand tons of these products.

Chicago users have been contracting fairly well for first quarter. Washer demand from consumers and jobbers is likely to increase, as buying has been small.

Delay in production of new automobile models is reflected in light demand for nuts and bolts from builders, at Cleveland. Automobile manufacturers have covered for first quarter, but comparatively few releases have been received.

Pig Iron

Pig Iron Prices, Page 32

Lack of first quarter contracting occasions no surprise among pig iron sellers, in view of the heavy shipments prevailing throughout December. Until melters consume some of their heavy stocks new business probably will be light.

Blowing in of the American Rolling Mill Co.'s blast furnace at Columbus, O., affects the market in Pittsburgh, since this company's Butler, Pa., plant, with ten open hearths, had been a buyer of basic iron in the open market.

Chicago reports indicate automotive foundries are increasing operations and farm implement manufacturers are taking more iron. The market there is firm at $17.50, furnace, for No. 2 foundry and malleable.

Some sales of Alabama and Buffalo iron are reported in the Cleveland district, the freight from Birmingham to Cleveland being $6, and from Buffalo $2.65. National Tube Co., Lorain, O., is resuming production from one of its banked blast furnaces, on bessemer iron. No tonnage inquiries are pending in the Cincinnati territory.

Pig iron sellers in Philadelphia look for early resumption in equipment demand from railroads.

An encouraging volume of "fill-in" specifications has come out in the New York market. Inquiries from the larger consumers are expected later this month, according to Boston advices. Prices are firm, with Dutch iron more in line with domestic quotations. The market is slow in Buffalo.

One blast furnace has been taken off at Birmingham, Ala., leaving nine in operation. Pipe plants there report additional business which will call for delivery of iron this quarter. Purchases in the St. Louis district are light.

Scrap

Scrap Prices, Page 33

Chicago—In the absence of large purchases by melters scrap prices continue supported by demand from dealers and brokers, and quotations have acquired some additional strength. Small sales of heavy melting steel have been made to two mills at $10.50, but sellers ask this figure and higher. Railroad scrap has commanded nearly $11, and although odd lots have been picked up for less than $10 this market may be quoted $10.00 to $10.50, an increase of 50 cents.

Pittsburgh—The market undertone is strong, due to deadlock between scrap buyers and sellers, both of which anticipate higher prices. One mill, in showing a preference for scrap rails, has indicated a market of over $13, this being above what is nominally considered the No. 1 heavy melting steel market.

Norfolk & Western closes Jan. 11 on 2000 tons of scrap.

Cleveland—New buying of scrap is confined to carloads, principally mixed borings and No. 2 busheling. Prices are unchanged but strong.

Boston—Scrap prices are stronger, supported largely by firmer bids for outside shipment, although Worcester and Rhode Island consumers of heavy melting steel are paying more. Worcester is paying $8 to $8.25, delivered, for No. 1, with No. 2 grade $1 less and skeleton $6.50, delivered.

Philadelphia—Outlook for improved steel operations and further export demand are strengthening scrap prices here. No. 1 steel is now $11 to $11.50, delivered, with the latter figure the more representative and with indications pointing to a minimum of $12 for anything like a round tonnage for consumer account.

Buffalo—Demand for scrap is slow although regular shipments are being made on contracts. The market is firm. Blast furnace scrap is selling steadily in small lots.

Detroit—Consumers have not actually paid prices supporting another advance in most grades of scrap, but dealer trading is sufficiently broad and strong to indicate that $8.50 to $9 are the prices a melter would have to pay for No. 1 steel or hydraulic compressed sheets, an advance of 25 cents. Borings, new busheling, forge flashings, and short turnings also have lifted 25 to 50 cents. Sentiment continues basically strong.

Cincinnati—Iron and steel scrap in absence of mill buying is weaker, prices being unchanged through the firming influence of dealer expectancy of an early spring increase.

St. Louis—Activity in iron and steel scrap consists chiefly of strenuous efforts by dealers to secure material to apply on contracts. All grades of steel are scarce and holders anticipating further advances are disposed to hold.

Birmingham, Ala. — Little new business is reported though prices are unchanged. Dealers have ample supplies.

Warehouse

Warehouse Prices, Page 34

Advance of $3 per ton on cold-finished steel is being applied generally by warehouses.

Demand for steel from warehouse at New York has recovered most of the holiday decline, which was less pronounced this year.

The year has started with an encouraging volume of orders at Cleveland. Some interests in nearby districts report December the best month last year.

Cold-finished bars have been advanced $3 a ton to 3.50c for rounds, hexagons, flats and squares at Chicago. Other prices there are unchanged. Sales are more active than a year ago.

Cold-drawn bars are being advanced 15 cents per 100 pounds by Pittsburgh warehouses, to 3.35c for in-town Pittsburgh delivery. The advance has not been made effective, pending determination of the differential for delivery outside Pittsburgh and possible revision in quantity extra under 300 pounds.

Warehouse business at Detroit opens January hopefully. December volume was little changed from that early in the fourth quarter, completely reversing the season trend, and there are no indications that January will not carry on. Prices there are unchanged.

Leading iron and steel warehouses at St. Louis report moderate profits for 1933, thus reversing the results of 1932.

With business at a better pace than a year ago, jobbers at Philadelphia regard the outlook for this quarter with increasing confidence and look for a general upward trend.

Active demand for steel out of warehouse is evident at Cincinnati. Prices were reaffirmed for first quarter excepting on cold-finished steel, up from 3.55c to 3.70c.

Tin Plate

Tin Plate Prices, Page 30

Pittsburgh—With the first week of the new year, tin plate mill operations declined 30 points to an average of 45 per cent of district mill capacity. Canmakers show little interest in contracting for the first quarter, and few contract obligations are going ahead at the new $5.25, Pittsburgh, base. Long ternes are moving slowly at the new 3.25c. Pittsburgh, base.

Coke

Coke Prices, Page 31

Furnace coke finds few buyers in the open market and aside from contracts, which take $3.75, Connellsville, Pa., ovens, on standard grades, the market is slow. Foundry grades hold to $4.25 and $5, respectively, for standard and premium grades, applying at least through January.

Shipments of by-product foundry coke are holding well in the Chicago district. Shipments in December were moderately heavier than in November. Prices have been extended through January at $8.50, ovens, for outside delivery and $9.25, delivered Chicago.

The movement of by-product coke continues fair at St. Louis and the market is firm. Prices are steady, with no formal announcements for first quarter.

Semifinished Steel

Semifinished Prices, Page 31

Steel producers at Pittsburgh were busy through last week building up stocks of semifinished steel which became greatly reduced through December. This was more evident in wire rods and billets than in sheet bars. The market on sheet bars, billets and slabs is firm at $26, Pittsburgh, and wire rods at $36.

Metals

Nonferrous Metal Prices, Page 32, 33

New York—General lack of interest prevailed in the nonferrous metals last week and prices on some classifications moved lower.

Copper—Custom smelters openly quoted 8.25c, Connecticut, but the market lacked adequate test and it was uncertain what reception an inquiry of any size would be given. Customers of mine producers were understood to have been sold metal at under the 9-cent quotation which has been named for some time. Lack of progress on a code has retarded activity in copper.

Lead—Sellers cut prices $3 a ton Tuesday to 3.90c, East St. Louis, and 4.00c, New York, but this failed to stimulate demand.

Zinc—Shading developed and as the week closed metal could be had in several directions at 4.30c, East St. Louis. Little buying developed.

Tin—Straits held close to the 53-cent level. A little more consumer buying was in evidence.

Aluminum—Both virgin and remelt grades were quiet but steady.

Antimony—Prices were firm but lacked buying support.

Equipment

Wheeling Steel Corp., Wheeling, W. Va., has awarded contract to Mesta Machine Co., West Homestead, Pa., for a continuous cold strip mill to be installed at the Yorkville, O., plant of the Wheeling company. The mill will comprise five stands of small 4-high units, the design differing from two other distinct patents covering the same general type of cold strip mill.

This mill is the large part of a $1,000,000 plant expenditure being made by the Wheeling company. Orders for electrical equipment involved have been divided between General Electric Co. and Westinghouse Electric & Mfg. Co.

Youngstown Sheet & Tube Co., Youngstown, O., is planning soon to begin production of small sizes of electric weld pipe and it is estimated that the company will spend $1,500,000 for equipment which will include at least four or five new sets of forming rolls for the production of pipe as small as 2-inch diameter.

For the present the company is making alterations to its present electric weld pipe mill, to run tests on the smaller sizes. A new set of forming rolls has been ordered from the Yoder Co., Cleveland, for this preliminary installation. The new mill will be built at the company's Brier Hill plant, where at present electric weld pipe from 18 to 26 inches in diameter is being made.

Barium Steel Corp., Canton, O., is inquiring for unstated items of mill equipment, preferring used machinery.

Awards are being made on a considerable volume of equipment for the navy department on which bids were taken several weeks ago, including worm and gear hobbing machinery, spiral gear generating machines, boring, milling and drilling machines, milling machines, lathes and a crank shaper.

Several machine builders in the Worcester, Mass., district, notably one maker of grinding equipment, have built up sizable backlogs.

According to reports from Chicago, the advance in the price of silver has served to stimulate interest in equipment purchases by Mexican plants. The Milwaukee road has closed on additional tools at Chicago, including lathes, a bolt cutter and pipe machine. List of more than 100 machine tools for the new Lane Technical high school, Chicago, again is active, with the possibilities of a loan being obtained for purchase of this equipment.

Ferroalloys

Ferroalloy Prices, Page 32

While spot domestic spiegeleisen prices were reduced recently $1 a ton to $26, contract prices were advanced. The understanding that the reduction also would affect contracts for the first half was in error.

Coke By-Products

Coke By-Product Prices, Page 31

New York—Sulphate of ammonia prices have been extended to June at $25 a ton, f.o.b. cars, Atlantic port. Expecting an advance, some buyers ordered actively last month, but shipments now have declined. Consumers of distillates have generally covered and are specifying moderately. Prices are unchanged.

Quicksilver

New York—Quicksilver prices are firmer here on improved demand. Small lots are $67 to $68, a virgin flask of 76 pounds, with some asking prices ranging up to $69. Round lots are quotably less, prices touching $66.

Pacific Coast

Pacific Coast Prices, Page 31, 32, 34

San Francisco—*(By Air Mail)*—While full returns for the final week have not yet been received the tonnage of structural steel placed during 1933 evidently was the largest for any year in the history of the coast. Over 257,000 tons have already been reported. This compares with over 188,000 tons, the next largest yearly aggregate, placed in 1929. Reinforcing bar lettings will exceed the 1932 total by more than 23,000 tons. Plate and cast iron pipe bookings fell below last year's level.

The largest concrete bar award during the week called for 231 tons

for highway work in Los Angeles county, California, placed with an unnamed interest. Pending business exceeds 8300 tons, including 2300 tons for a dam at Bonneville, Oreg.

The metropolitan water district, Los Angeles, has placed 150 tons for conduit forms with an unnamed interest. Inglewood, Calif., has just opened bids on 110 tons of 24-inch welded pipe.

Structural awards did not exceed 500 tons. Mare Island has taken bids on 400 tons for two hammerhead cranes. Pending and proposed projects already involve 95,000 tons work will be let early in 1934.
and it is thought that most of this

Little of interest developed in the cast iron pipe market and pending business does not exceed 1500 tons. Napa, Calif., has taken bids on 145 tons and Los Angeles will open bids Jan. 11 for about 200 tons of 2-inch pipe.

Northwest Sales Active

Seattle—Iron and steel industries of the Pacific Northwest face a busy period, with many large projects pending. The outlook is materially improved.

Awards this week were heavier than for some time, totaling nearly 2000 tons. Bethlehem Steel Co. booked 400 tons of plates and 100 tons of shapes for three coast guard cutters to be built by the Lake Union Dry Dock & Machine Works, Seattle. Pacific Coast Steel Corp., Seattle, took 130 tons of reinforcing bars for a state bridge in Pierce county, 175 tons for the Tacoma seawall and Fort Lewis jobs and 200 tons for state highway work.

Northwest Steel Rolling Mills, Seattle, has booked 150 tons for state road jobs. About 400 tons involved in Montana highway viaducts went to unnamed interests.

Steel Fabricators Inc. will furnish 62 to 100 tons for a state bridge at Snoqualmie, Wash. About 900 tons of shapes and 200 tons of reinforcing are involved in a state overhead crossing on Fourth avenue South, Seattle, bids Jan. 9.

The one bid for the Seattle seawall project has been rejected and another call set for Jan. 11. If reasonable tenders are not received, city officials propose to proceed by day labor. Funds available total $1,300,000.

Reclamation bureau will open bids at Ontario, Oreg., Jan. 16, for 194 tons of reinforcing and construction of the Owyhee and Snively river siphons, involving 206 tons of reinforcing bars, 432 tons of shapes and 900 tons of welded plate steel siphon pipe and a three-span truss bridge 515 feet long.

Jobbers had a better turnover this month than expected, structurals, plates and sheets being in best demand. Hardware jobbers are sold out on shovels, picks and other items required for CWA projects.

Cast iron pipe demand has also been stimulated by this work. Pipe prospects are more promising than in three years.

Steel in Europe

Foreign Steel Prices, Page 34

London—(*By Radio*) — Substantial deliveries have been resumed in the steel and iron market immediately following the holidays. Middlesbrough pig iron is becoming scarce but hematite stocks are heavy.

Production is hardly coping with

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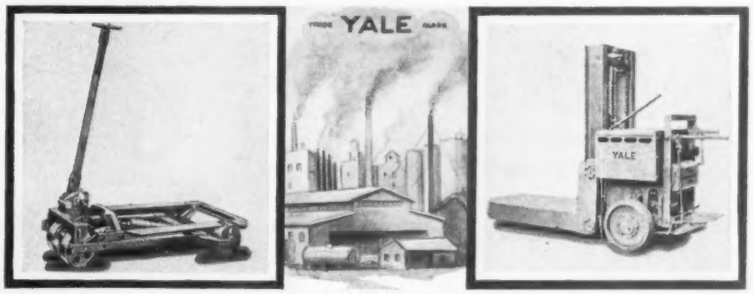

THE YALE & TOWNE MFG. CO.

PHILADELPHIA DIVISION, PHILADELPHIA, PA., U. S. A.

Makers of Yale Hand Chain Hoists, Electric Hoists, Trolleys, Hand Lift Trucks and Electric Trucks

demand for pig iron and semifinished steelmakers generally are sold into the spring. Finished steel is also active and some Continental steel is selling at relatively low prices. Manufacturers of tin plate now are looking more to the home trade than to exports.

Continental business is quiet, owing to the holidays, but is expected to improve shortly.

Here and There In Industry

TUBULAR SERVICE CORP., 120 Forty-fourth street, Brooklyn, N. Y., has opened an office and warehouse at 721-727 Sedgley avenue, Philadelphia. This is the fourth warehouse established by this company, the others being at Brooklyn, Pittsburgh and Boston. Tubular Service Corp. deals exclusively in tubular materials and carries large and complete stocks of boiler tubes, condenser and evaporator tubes, seamless and electric welded mechanical steel tubing, etc. The company distributes for a number of mills, including Steel & Tubes Inc., Boiler Tube Co. of America, Pittsburgh Pipe Coil & Bending Co.

□ □ □

Automatic Burner Corp., manufacturer of ABC oil burners, Chicago, was host Jan. 5 to representatives of more than 30 stove and range manufacturers. The design construction and merchandising of oil burning stoves and ranges was discussed and a large market for 1934 indicated. Talks were made by Carl Hoffstetter, president of the Odin Stove Mfg. Co.; H. J. Waff, of Norfolk, Va.; Carl Froelich, vice president of the Continental Stove Corp.; J. H. Hirsch, Joseph Hirsch and Stanley Perry of the Automatic Burner Corp.

□ □ □

Reed-Prentice Corp., Worcester, Mass., manufacturer of machine tools, has appointed J. C. Austerberry's Sons 684 East Congress street, Detroit, its exclusive agents for Detroit territory.

□ □ □

Thompson Boiler Works, Los Angeles, Calif., has noted an increase of 50 per cent in business the last four months of 1933, compared with the first four.

□ □ □

Sale of the Rayglo Corp. stove factory at Athens, O., to the Great State Mower Corp., Shelbyville, Ind., will result in removal of the former plant to Shelbyville.

□ □ □

Lynch Corp., Anderson, Ind., maker of machinery for glass manufacturing, has bought the Baldwin-Wyoming shovel plant at Anderson, containing 70,000 square feet of floor space and will consolidate its unit at Columbus, O., with the Anderson works in the new plant. Employment will be much increased after the consolidation.

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Labor

(*Concluded from Page* 12)

1700 miners quit work at two divisions of Bethlehem Mines Corp.

¶Wages in sheet and tin plate mills having contracts with the Amalgamated Association of Iron, Steel and Tin Workers will be unchanged for January and February, it was determined at the bimonthly settlement in Youngstown, O., last week. The average price of Nos. 26, 27 and 28 gage black sheets in November and December was reported as 2.40c. Wages are 1½ points above base, including the 15 per cent extra pay granted since last September.

Forecasts for 1934

WALTER S. TOWER, executive secretary, American Iron and Steel institute:

"The iron and steel industry is looking to 1934 with the feeling that the lowest point of the depression has been passed, and that the coming months should bring a measure of improvement in consumption and output of steel products. . . . For the first time in many years the art of true salesmanship is becoming a factor in selling steel. . . . Under the code a fair measure of price stability is likely to prevail, because of the open price provisions. . . . There are many predictions that automobile production will be increased 25 to 30 per cent."

¶William Green, president, American Federation of Labor:

"The outlook for the new year is bright and reassuring. Unemployment has been reduced, business of all kinds shows marked improvement, and there is abundant evidence of renewed courage and revived hope."

¶A. W. Robertson, chairman, Westinghouse Electric & Mfg. Co.:

"When capital goods business finally yields to the many forces now being exerted for its improvement, the electrical industry cannot fail to benefit and again resume its rightful place as one of our most essential and prosperous industries."

Canada

SAMPLES of first tin plate being produced by Richard Thomas Co. Ltd. in the Sarnia, Ont., plant of the Dominion Alloy Steel Corp. are being exhibited. At the outset, this new Canadian producer of tin plate is tinning black plate imported from Wales, but it is expected that eventually black plate will be rolled at Sarnia.

Plastic Forming Of Metals

(*Concluded from Page* 25)

this case according to equation (41), and the determination of the torque on the lower roll according to equation (42). The investigation was made on the test stand, without there having been earlier opportunity for the rolling mill to be run in. The motor power consequently increased in the first test, because of the pronounced heating of the lower bearings in the course of each pass. The increase of

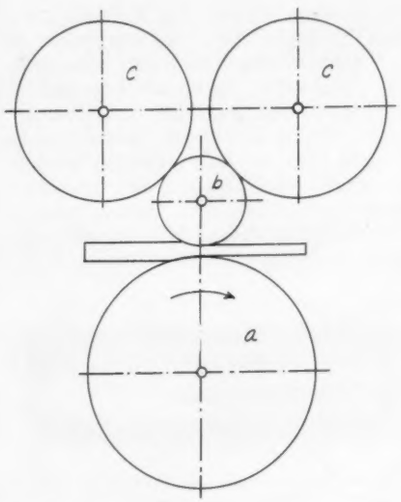

Fig. 65—Diagrammatic representation of roll arrangement in cold-rolling mill, C

the motor power during the passage of each coil can be observed in column 10. The separating force and the pure rolling power, however, remain constant during the pass; so that the growth of the motor power corresponds to an equally great increase in the power loss. As the bearings became worn in, the increase of the power requirement steadily became smaller, which is shown clearly as early as the second test series. During the last two test series, the power consumption remained practically constant for the entire rolling process.

(*To be continued*)

To Pave English Tunnel With Cast-Iron Blocks

A road surface formed of cast-iron blocks has been adopted for the Mersey tunnel between Liverpool and Birkenhead, England, according to *The Overseas Engineer*. The total area of the roadway to be surfaced in this manner is about 50,000 square yards.

In both cities, the tunnel branches into two approaches, providing separate dockside and through-traffic lines. In the through-traffic portion the width of the roadway between curbs is 36 feet, while in each of the dockside branches it is 19 feet. Total length of the roadway is 15,465 feet, or nearly 3 miles. The 36-foot roadway is about 10,584 feet long, and will afford space for four lines of traffic abreast. Three thousand vehicles will be able to pass through the tunnel each hour.

The completed tunnel will cost something in the neighborhood of six to seven million pounds, or between 30 and 35 million dollars. This type of iron roadway is said to be cheaper than some of the present road materials provided for dealing with the heavier forms of modern traffic, but is slightly more expensive than an ordinary road-surface requiring repairs every few years. It consists of cast-iron sections, the studs of which are hardened by a special chemical process in casting, for which patents are pending.

Recent tests have demonstrated the necessity for providing a dense, hard material to a considerable depth of the surface, to resist the wear and tear of heavy traffic; and the special hardening process referred to, has the effect of producing this condition without affecting the strength of the casting.

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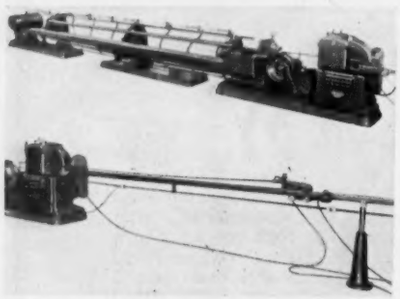
DETROIT

(AT CASS AND BAGLEY AVENUES)

New Internal Tube Grinder Embodies Novel Idea

Mattison Machine Works, Rockford, Ill., recently developed a machine for internal grinding of tubes and pipes. A flexible coated abrasive belt travels around pulleys and through the tube at a high rate of speed. Suitable supporting and driving rolls hold the tube in place and revolve it during the grinding process. Grinding pressure is secured by means of a pneuematic head attached to a hollow ram rod. Air pressure passes through the rod into the expansible head, causing it to exert pressure against the belt. The unit, shown herewith, can be furnished to handle tubes ½-inch inside diameter and up.

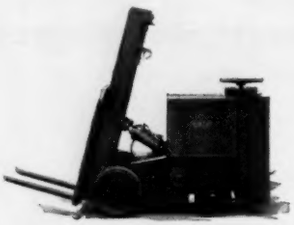


Internal tube grinder built by Mattison Machine Works

◆ ◆ ◆

Adds New Tilting Telescopic Fork Truck to Line

Mercury Mfg. Co., 4118 South Halsted street, Chicago, recently announced a new model tilting telescopic fork truck as the latest addition to its line of electric and gas-powered lift trucks. The fork elevating system, as in platform lift trucks, is by means of a motor-driven gear pump which actuates the hydraulic ram carrying two large sheaves over which the double lifting cables operate. The fork tilting action is by two double acting hydraulic cylinders actuated by the same oil pump, and controlled by a separate oil valve. The heavy-duty drive motor is mounted directly over the drive axle in a unit assembly. Drive control is a quick-acting magnetic contactor system with manually operated master control. Hoist motor is operated through a similar magnetic contactor system. Type T.T.T. fork trucks, shown herewith, are available in a complete range of models.



Mercury tilting telescopic fork truck

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Corrugated Magnets Feature Magnetic Separator

Patterson Foundry & Machine Co., East Liverpool, O., has developed a new high intensity magnetic separator for removing metallic particles. Equipped with unusually heavy magnets, the unit, shown herewith, is housed in a hermetically sealed aluminum case and has an automatic aluminum discharge trough which tilts back if the current is cut off, thus preventing unclean liquids from passing through. Much higher efficiency is claimed from the use of novel corrugated auxiliary magnets which exude the magnetic flux through thousands of knife edges thus increasing the intensity.

New Patterson high intensity magnetic separator

◆ ◆ ◆

Vertical Drive Bases Maintain Correct Belt Tension

Rockwood Mfg. Co., Indianapolis, recently developed vertical drive bases which provide for and maintain

Rockwood vertical motor base employs coiled springs

NONSHRINK OIL HARDENING

TOOL STEEL TUBING

Manufacturers of BISCO Tungsten Carbide and Tantalum Carbide drawing dies for wire, rod and tubing.

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THE BISSETT STEEL CO., Inc.

945 East 67th St., CLEVELAND, OHIO

Cincinnati **Pittsburgh** **Buffalo**

tain correct belt tension on both pulleys. As in all drives manufactured by the company the motor is suspended from a pivot shaft, but in this adaptation, shown herewith, the weight of the motor is counterbalanced by two coiled springs connected by rods to the bracket arms, rather than by the weight of the motor. These springs are adjustable for belt tension. The pivot shaft of the base is movable vertically by means of convenient adjusting screws. The base permits the machine operator to set the belt tension to match each change in work.

Another recent development of the company is a ceiling base that is quite similar to the standard base excepting that it has special hanger arms which suspend the motor horizontally.

• • •

Develops Round Chart Recorder for Industrial Control

Leeds & Northrup Co., 4901 Stenton avenue, Philadelphia, has developed a round chart Micromax recorder, shown herewith, for industrial control. Pointer and pen swing out so that the chart can be changed easily. In many applications, the indicating features adds to the value of the recorder. The large black pointer rotates over a circular scale 28 inches in length. Designated model R, the unit can be equipped to operate alarms or lights to guide the operator. In addition to its recording and indicating features, and in place of its signaling features, this recorder can be equipped to operate two-position or three-position control contacts for automatically maintaining a desired condition. Chart scale is graduated by means of concentric circles, spaced for ease and precision in reading.

Round chart recorder developed by Leeds & Northrup Co.

Alloys To Find Wide Use In Transportation Fields

(*Concluded from Page 23*)

negie Institute of Technology; Carpenter Steel Co.; Colonial Steel Co.; Colorado Fuel & Iron Co.; Columbia Steel Co.; Columbia Tool Steel Co.; Electro Metallurgical Co.; Engineering Foundation; Follansbee Bros. Co.; General Electric Co.; General Motors Corp.; Henry Disston & Sons Inc.; Heppenstall Forge & Knife Co.; Inland Steel Co.; International Harvester Co.; International Nickel Co.; Latrobe Electric Steel Co.; Lehigh university; Lukens Steel Co.; Massachusetts Institute of Technology; Mesta Machine Co.; National Cash Register Co.; National Malleable & Steel Castings Co.; Pacific Coast Steel Co.; John A. Roebling's Sons Co.; Sharon Steel Hoop Co.; Singer Mfg. Co.

Society of Automotive Engineers; Southern California Iron & Steel Co.; Spang, Chalfant & Co.; Taylor-Wharton Iron & Steel Co.; Timken Roller Bearing Co.; Vanadium Corp. of America; Vulcan Crucible Steel Co.; Warman Steel Castings Co.; Western Electric Co.; Westinghouse Electric & Mfg. Co.; Weirton Steel Co.; Wheeling Steel Corp.

Members of the Iron Alloys committee of the Foundation in addition to Chairman Waterhouse are Lyman J. Briggs, director, bureau of standards; Scott Turner, director, bureau of mines; R. E. Kennedy, technical secretary, American Foundrymen's association; H. W. Gillett, director, Battelle Memorial institute; Bradley Stoughton, professor of metallurgy, Lehigh university; Jerome Strauss, chief research engineer, Vanadium Corp. of America; T. H. Wickenden, metallurgical engineer, International Nickel Co.; James H. Critchett, vice president, Union Carbide & Carbon Research Laboratories; and John A. Mathews, vice president, Crucible Steel Co. of America. The editor is Frank T. Sisco.

Will Meet in Cleveland

Directors of the Association of Iron and Steel Electrical Engineers have chosen Cleveland as the city in which the 1934 annual convention of the association will be held, Sept. 18-20. Of interest to the membership and manufacturers of steel mill equipment is the decision to hold the usual iron and steel exposition in conjunction with the meetings. All sessions as well as the displays will be centered at the Cleveland public auditorium.

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Construction and Enterprise

New York

BATAVIA, N.Y.—Plant of the Massey-Harris Co., at Batavia, Henry G. Trelawney, superintendent, has resumed production after idleness of two years, with about 325 former employes on the payroll.

ROCHESTER, N. Y.—Kellogg Mfg. Co., which had under consideration removal of its Canadian branch from Toronto, Ont., to Niagara Falls, Ont., has reconsidered and instead has removed to more suitable quarters at 136 Simcoe street, Toronto.

New Jersey

BERGENFIELD, N. J.—Bergen County Iron Works has been incorporated with 2500 shares no par value, by Samuel Kessel, Bergenfield, N. J.

Ohio

CINCINNATI — Morrison Drabner Steel Co. Inc. has been incorporated with 200 shares no par value, by Louis Nippert and associates, 525 Walnut street, Cincinnati.

CLEVELAND—Continental Machinery & Supply Co. has been incorporated with 100 shares no par value, by Sol Edgert, Williamson building, and associates.

KENT, O.—General Air Conditioning Corp. has been formed here by D. S. Sawyer, president, and Charles Gougler, chairman of board, to manufacture air-conditioning equipment.

Michigan

CENTREVILLE, MICH. — Application has been made by the village to the state PWA advisory board for a loan of $35,000 for construction of a waterworks system.

DETROIT—Henry Kohner, Detroit, architect, has completed plans for a client for a distillery plant one to four stories, including main distilling building, power plant, rack warehouse and office building.

Indiana

EVANSVILLE, IND.—Faultless Caster Corp., 1421 North Garvin street, has been incorporated with $100,000 capital, to manufacture casters and other furniture hardware, by Bernard H. Noelting, L. R. Halvorsen and associates.

GARY, IND.—Gary Sheet & Tube Co. has increased its capital stock from $20,000 to $35,000. Richard E. Buhns, 11 South LaSalle street, Chicago, is correspondent.

KOKOMO, IND.—Walton & Macke Nail Co. Inc., 801 North Armstrong street, has been incorporated with $40,000 capital to manufacture nails, by Ernest Walton, Fred Macke Jr. and associates.

PRINCETON, IND.—Potter & Brumfield Mfg. Co. Inc., 617 North Gibson street, has been incorporated to manufacture electrical and mechanical equipment, with capital of 200 shares no par value, and E. E. Potter, John A. Brumfield and associates.

Illinois

CHICAGO—Liberty Metal Corp., 201 North Wells street, room 1924, has been incorporated with 50 shares capital stock to deal in scrap metals, by Morris Aronson, correspondent, 201 North Wells street.

CHICAGO—Container Corp. of America, 111 West Washington street, has started a program of modernization and improvement in equipment of two of its plants here. This includes installation of modern boiler equipment as well as rebuilding of paper machines and special equipment.

GALVA, ILL.—Galva Furnace & Foundry Co. is being organized and a fund raised to start it in operation. A local foundry plant is to be utilized. F. E. Garnett and Dr. Robert Stewart are interested, both of Galva, Ill.

Southern States

WASHINGTON—Bureau of supplies and accounts, navy department, will open bids Jan. 16 on schedule 1502 for two motor-driven radial drills for Sewall's Point, Va., and San Diego, Calif.; schedule 1503, one motor-driven universal bench milling machine for San Diego, Calif.

CHATTANOOGA, TENN.—Columbian Iron Works, recently bought by the Mueller interests, will be added to by the new owners at cost of $200,000 to $300,000. Two additional buildings will be erected. W. E. Mueller is president.

MEMPHIS, TENN.—Meers & Wallenta have been awarded a contract for construction of a cheese factory at Collierville, Tenn., to cost $10,000, with equipment costing $25,000.

Missouri

ST. LOUIS—PWA has allocated $161,169 for establishing lighting facilities and emergency landing fields at 50-mile intervals on the St. Louis-Tulsa air route, and $143,454 for similar facilities on the St. Louis-New Orleans air route, in preparation for night mail service.

ST. LOUIS—Curtiss-Wright Airplane Co., Wichita, Kans., plans construction of an airplane manufacturing plant in China at a cost of $5,000,000. A contract with the Chinese government is being negotiated by which the latter will buy or dispose of 60 planes a year. Motors will be imported from the United States.

Texas

CORPUS CHRISTI, TEX.—Southern Alkali Co., now building a chemical plant at this place, will build a 60-mile pipeline to carry brine from its salt deposits near Benavides, Tex., to its plant here.

DALLAS, TEX.—Trinity Sales Co. Inc. has been incorporated with $500 capital to manufacture metal products, by David W. Hardy and P. G. Peurifoy, Dallas, Tex.

Wisconsin

BEAVER DAM, WIS.—Permanent Construction Co., 735 North Water street, Milwaukee, has been awarded contract for construction of the municipal sewage disposal plant, to cost $210,000. Equipment suppliers include Chain Belt Co., Milwaukee; Pacific Flush Tank Co., Yeomans Bros. Co., Wallace & Tiernan and Chicago Bridge & Iron Works, all of Chicago.

GREEN BAY, WIS.—Contracts have been awarded for construction of a $35,000 service shop and general office building for the wholesale coal yards of the Cleveland-Cliffs Iron Co., at 1720 South State street, Green Bay, Wis. W. J. McCormick is branch manager.

MANITOWOC, WIS. — Invincible Metal Furniture Co., Manitowoc, has taken a $19,000 order for equipment for the new department of agriculture branch office in the new Chicago post-office building, for delivery in March.

MENOMONEE FALLS, WIS.—Milwaukee and local investors have formed a syndicate to acquire a beet sugar plant here and remodel it into a distillery with annual output of 1,350,000 gallons of whisky. Capital stock is $375,000. F. E. Schunk is chairman of the organization committee.

MILWAUKEE—Burns & McDonnell, consulting engineers, Kansas City, Mo., have been engaged by the city to make a survey relative to the proposed $14,000,000 municipal power and light plant.

MILWAUKEE—Alvord, Burdick & Howson, 20 North Wacker drive, Chicago, have been appointed consulting engineers on a $4,600,000 municipal water filtration plant for which federal aid has been allowed. Joseph P. Schwada is city engineer.

WAUKESHA, WIS.—Machael Yundt Co. is making delivery to the Hawaii Brewing Co., Honolulu, T. H., of a large soaked air brush bottle washer and an automatic torpedo pasteurizer, costing about $50,000.

Pacific Coast

BELLINGHAM, WASH.—Whatcom Natural Gas Co. has been organized with $250,000 capital by R. D. Williams, Insurance building, C. S. Shippey and associates.

SEATTLE—Cascade Machinery & Electric Co. has the contract for equipment for a $40,000 powerhouse at Toledo, Oreg., for the Creamery Package Mfg. Co., including two 250-horsepower boilers and a 625-kilovolt-ampere generator.

YAKIMA, WASH.—Construction has been started on an industrial alcohol plant, capacity 500 to 2000 gallons per day, to start production July 1, using grains, fruits and vegetables from nearby. K. E. Vaughn, industrial engineer, Seattle, is supervising construction.